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USE OF THE PEDIATRIC EMERGENCY DEPARTMENT
FOR NON-URGENT CARE:
A STUDY OF FACTORS ASSOCIATED WITH
ACTUAL AND EXPECTED WAIT TIME

EMILY KAHNAN CHEUNG

YALE UNIVERSITY

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FOR NON-URGENT CARE:
A STUDY OF FACTORS ASSOCIATED WITH
ACTUAL AND EXPECTED WAIT TIME**

By

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A.B. Harvard University 2001

A Thesis Presented to

The Faculty of the Department of Epidemiology and Public Health

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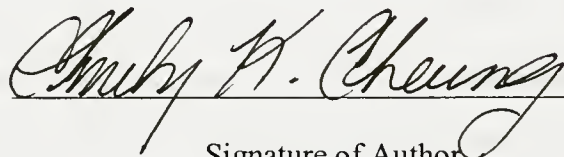
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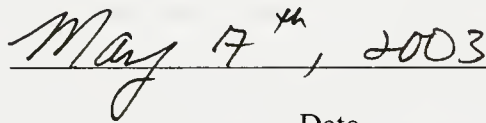
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ABSTRACT

Background: One factor contributing to ED overcrowding could be the appearance of patients with non-urgent conditions. Increasing ED volumes has led to increasing wait times for patients in the ED. It is unclear, though, how closely patient or parent expectations for wait time correlates with Actual wait time in non-urgent cases.

Methods: This study compared Yale New-Haven Children's Hospital Emergency Department (YNHCH ED) parent/caretaker Expected wait time with Actual wait time and explored whether wait time variables are associated with 3 different categories of variables—1. Current Visit—variables chosen to reflect objective measures of the ED and assessed by the ED 2. Parent and 3. Child—variables chosen to reflect factors particular to either individual that may influence the decision to seek ED care. Following unadjusted bivariate analyses of these variables with each wait time variable, multivariate linear regression models of Actual, Expected, and (Actual – Expected) wait time were built.

Results: Patients who registered when the ED was busiest and who had lower acuity (Acuity Level IV) experienced longer Actual wait times. In multivariable analyses, parents/caretakers of lower acuity patients, of patients with no chronic illness, of patients with insurance other than Medicaid, of patients who had visited any ED in the 12 months prior to the survey, and Hispanic parents/caretakers tended to underestimate their Actual wait time.

Discussion: This study highlights the groups of patients for whom educational efforts might be targeted to encourage more realistic expectations about wait times in the ED. These groups include Hispanic parents/caretakers, parents/caretakers of patients with no chronic illness, of patients with non-Medicaid insurance, of patients triaged at Acuity Level IV, and of patients who had not been to any ED in the 12 months prior to the survey. Large-scale programs to inform parents/caretakers about Actual wait time may not be effective because a number of parents/caretakers already overestimate or accurately estimate wait times.

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TABLE OF CONTENTS

Abstract.....	iii
Acknowledgements.....	iv
List of Tables.....	vi
List of Figures.....	vii
Background.....	1
Methods.....	11
Results.....	18
Discussion.....	27
References.....	38
Appendices.....	41

LIST OF TABLES

Table 1: Variable Descriptions.....	16
Table 2: Wait Time Unadjusted Means.....	19
Table 3: Multivariate Linear Regression for Actual Wait Time.....	24
Table 4: Multivariate Linear Regression for Expected Wait Time.....	25
Table 5: Multivariate Linear Regression for (Actual – Expected) Wait Time.....	26
Average Weekly Patient Volume Tables (2).....	Appendix II
Sample Times Table.....	Appendix III
Parent/Caretaker Characteristics Tables (2).....	Appendix IV
Child Characteristics Tables (2).....	Appendix V
Wait Time Bivariate Analyses Data Tables (3).....	Appendix VII
Hispanic Regression Table.....	Appendix VIII
Chronic Illness Table.....	Appendix IX
Medicaid Tables (2).....	Appendix X
Regression Model Calculation Tables (31).....	Appendix XI

LIST OF FIGURES

Figure 1: Total Emergency Department Registration Data.....	18
Figure 2: (Actual – Expected) Frequency Distribution.....	20
All Wait Time Frequency Distributions.....	Appendix VI

Background

Overcrowding in emergency departments (EDs) has been reported as a national problem. The April 2002 American Hospital Association survey of 36% of all US hospitals with EDs (n=1501), reported 62% of hospitals surveyed perceived themselves as “at” or “over” capacity.¹ The growing demand for health care services in combination with a decrease in the number of EDs has caused overcrowding in the remaining open EDs. Data from the National Hospital Ambulatory Medical Care Survey notes that from 1997 to 2000, ED visits rose from 94.9 million annual visits to 108.0 million annual visits.² While the total number of visits continues to rise, the total number of EDs has fallen. The American Hospital Association estimates that between 1988 and 1998, 1,128 hospital EDs closed.³ In combination, these statistics indicate that higher ED volumes are being concentrated in fewer EDs leading to overcrowding.

Costs of ED overcrowding are high. In a 1994 study, Baker and Baker found that the use of an ED costs an average of \$144 for a first visit compared to \$43 for a first visit in a non-emergency department setting.⁴ A 5-year prospective study on non-urgent ED use by Robert Derlet, Donna Kinser, Lou Ray, Bridget Hamilton, and Judy McKenzie (1995) found that referring non-urgent patients to other sources of care caused a savings of \$3,696,735.⁵ Karen Thompson and Doris Glick (1999) report that a study conducted by Kelly (1994) found that partnering a California ED with an outpatient clinic resulted in a drop of non-

¹ The Lewin Group, “Emergency Department Overload: The Results of the AHA Survey of Emergency Department (ED) and Hospital Capacity,” April 2002.

² Linda F. McCaig and Nghi Ly, “National Hospital Ambulatory Medical Care Survey: 2000 Emergency Department Summary,” *Advance Data: From Vital and Health Statistics*, 326 (April 22, 2002): 2.

³ American College of Emergency Physicians Website, Emergency Medicine Statistical Profile, July 2001. Available at: <http://www.acep.org/1,381,0.html>, Accessed November 9, 2002.

⁴ Laurence C. Baker and Linda Schuurman Baker, “Data Watch: Excess Cost of Emergency Department Visits for Nonurgent Care,” *Health Affairs* (Winter 1994): 165.

⁵ Robert Derlet, Donna Kinser, Lou Ray, Bridget Hamilton, and Judy McKenzie, “Prospective Identification and Triage of Nonemergency Patients Out of an Emergency Department: A 5-Year Study,” *Annals of Emergency Medicine*, 25:2 (February 1995): 220.

urgent patients in the hospital ED from 28% to 9% and a drop of costs for providing non-emergency care to these patients from \$1 million to \$400,000.⁶

One factor contributing to ED overcrowding could be the appearance of patients with non-urgent conditions. In a 1993 national study of hospital EDs, the General Accounting Office (GAO) reported that overcrowding was largely caused by patients seeking care for non-urgent problems.⁷ They found that in 1990, more than 40% of patients utilized the ED for non-urgent issues. David Baker, Carl Stevens, and Robert Brook (1994) reported that 67% of a random sample of their study population had presenting complaints that were classified as non-urgent.⁸ John Billings, Nina Parikh, and Tod Mijanovich (2000) reported that the rate of ED use for non-emergent care was high for both children and adults—42 percent; Of ED use by children, only 22 percent actually involved emergency treatment.⁹ Other studies of ED use report non-urgent patients making up from 15% to 75% of the total patient volume¹⁰ with a greater percentage of non-urgent visits being made

⁶ Kelly in Karen MacDonald Thompson and Doris F. Glick, “Cost Analysis of Emergency Room Use by Low-Income Patients,” *Nursing Economics*, 17:3 (May-June 1999): 143.

⁷ US General Accounting Office. *Emergency departments: unevenly affected by growth and change in patient use*, 1993, Available at: <http://161.203.16.4/d36t11/148331.pdf>, Accessed November 9, 2002.

⁸ David W. Baker, Carl D. Stevens, and Robert H. Brook, “Regular Source of Ambulatory Care and Medical Care Utilization by Patients Presenting to a Public Hospital Emergency Department,” *JAMA*, 271:24 (22 June 1994): 1909-1912.

⁹ John Billings, Nina Parikh, and Tod Mijanovich, “Emergency Room Use: The New York Story,” The Commonwealth Fund Issue Brief, (November 2000): 4.

¹⁰ Marc Afilalo, Alex Guttman, Antoinette Colacone, Jerry Dankoff, Chris Tselios, Marie Beaudet, and Josee Llyd, “Emergency Department Use and Misuse,” *The Journal of Emergency Medicine*, 13:2 (1995): 262-3 report that 15% of the total number of patients using the ED in their study were non-urgent; Mark G. Burnett and Steven A. Grover, “Use of the emergency department for non-urgent care during regular business hours,” *CMAJ JAMC*, 154:9 (1 May 1996) report that some emergency departments classify more than one third of their visits as non-urgent; “Research: Most emergency room visits are not for emergencies,” managedhealthcare.info, Sept 9, 2002: 9 reports that approximately 75% of all pediatric emergency department patients could have been seen in a less acute setting; Marcie A. Rubin and Marni J. Bonnin, “Utilization of the Emergency Department by Patients with Minor Complaints,” *The Journal of Emergency Medicine*, 13:6 (1995): 841 notes from previous studies that 59% of visits to the ED by highest income group patients were non-urgent and patients arriving by ambulance had minor conditions 18-85% of the time; Corrine D. Truman and Linda Reutter, “Care-giving and Care-seeking Behaviours of Parents Who Take their Children to an Emergency Department for Non-urgent Care,” *Canadian Journal of Public Health*, 93:1 (January-February 2002): 41 report that a review of Canadian studies of nonurgent ED use, nonurgent visits accounted for 3% to 71% of ED visits; Amitai Ziv, Jack R. Boulet, and Gail B. Slap, “Emergency department utilization by adolescents in the United States,” *Pediatrics*, 101:6 (June 1998) report that across all adolescent age groups and both sexes, approximately one-half of the visits were not urgent.

by pediatric patients.¹¹ Literature on the factors that result in patients seeking emergency care in EDs have found that non-urgent patients often utilize the ED because they felt it was more convenient,¹² their primary care physician's office was closed,¹³ or because they felt that they would receive better quality of care at the ED.¹⁴ Many frequent users of the ED who often include patients with non-urgent conditions report that they choose to use the ED for care because they felt that ED care would be most expedient.¹⁵ Some studies report that non-urgent patients are generally aware that their condition does not warrant emergency care¹⁶ though in the case of pediatric patients where parents/caretakers usually decide

¹¹ Susan L. MacLean, Elizabeth W. Bayley, Frank L. Cole, Lisa Bernardo, Patricia Lenaghan, and Anne Manton, "The LUNAR project: A description of the population of individuals who seek health care at emergency departments," *Journal of Emergency Nursing*, 25:4 (August 1999).

¹² See John Billings et. al., "Emergency Department Use in New York City: A Survey of Bronx Patients," The Commonwealth Fund Issue Brief, (November 2000): 1 report that one of three patients reported that their principal motivation for coming to the ED was convenience; Dave Boushy and Isser Dubinsky, "Primary Care Physician and Patient Factors that Result in Patients Seeking Emergency Care in a Hospital Setting: The Patient's Perspective," *The Journal of Emergency Medicine*, 17:3 (1999) p. 406 report that 55% of patients in their study came to the ED because it was convenient for them; Kiernan DeAngelis, Brenna Farmer, Kor Brewer, and Timothy Reeder, "Correspondence: Use of an ED by non-urgent patients," *American Journal of Emergency Medicine*, 20:4 (July 2002) report that ease of access appears to be the major influencing factor for ED use by nonurgent patients; Robert W. Derlet, John R. Richards, and Richard L. Kravitz, "Frequent Overcrowding in U.S. Emergency Departments," *Academic Emergency Medicine*, 8:2 (February 2001): 154 reports that in a study on ED utilization rates between the United States and the United Kingdom, citizens of both countries consider the ED to be a convenient source of immediate medical care for nonurgent medical problems; Narendra M. Kini and Richard T. Strait, "Nonurgent use of the pediatric emergency department during the day," *Pediatric Emergency Care* 14:1 (February 1998): 21 report that convenience was one of the primary reasons for using the ED among HMO enrollees. Kini et. al. found that convenience was rarely a reason for using the ED among the non-HMO population, however.

¹³ See Kevin Phelps, Christine Taylor, Sanford Kimmel, Rollin Nagel, William Klein, and Sandra Puczynski, "Factors Associated with Emergency Department Utilization for Nonurgent Pediatric Problems," *Archives of Family Medicine*, 9 (Nov/Dec 2000): 1089.

¹⁴ Burnett and Grover (1996) report that 60% of their sample of non-urgent patients stated they thought the emergency department would be the "best" place for them to receive care for their current medical complaint; Truman and Reutter (2002), p. 44 report that the perception that the ED provides better care than community alternatives was frequently cited as a factor influencing parents decision to use the ED for care for their children with non-urgent conditions.

¹⁵ Raymond H. Lucas and Sandra Sanford, "An Analysis of Frequent Users of Emergency Care at an Urban University Hospital," *Annals of Emergency Medicine*, 32:5 (November 1998) report that in a study conducted by Jacoby and Jones, "repeat users" of the ED reported expediency and immediacy as the factors mostly affecting their decision to use the ED over other sources of care; See MacLean, et. al.; Phelps, et. al., 1091 reported that a frequently quoted reason caretakers stated about why they brought their children with nonurgent conditions to the ED included "My child is seen more quickly in the ED."

¹⁶ Billings, et. al. (2000), "Emergency Department Use in New York City: A Survey of Bronx Patients," 1 report that only 14% of their survey respondents said they came to the emergency department because they thought they had an emergency condition; Boushy and Dubinsky (1999), 410 report that only 23% of patients believed that their illness was serious enough to warrant ED care.

whether the child is in need of ED care, parents/caretakers often overestimate or appear more uncertain about the seriousness of their child's condition.¹⁷

Recent articles, however, have noted that ED overcrowding is largely caused by the rise of acute patients arriving at the ED.¹⁸ Encouraging patients with non-urgent conditions to seek care from alternative sources nevertheless could still help alleviate the high volume faced by many EDs.

Increasing ED volumes has led to increasing wait times for patients seeking care in the ED. Patients with non-urgent conditions often face especially long wait times to see ED physicians. From 1997 to 2000, according to the National Hospital Ambulatory Medical Care Survey: 2000 Emergency Department Summary, the mean waiting time for non-urgent visits increased by 32.5% from 51.1 minutes to 67.7 minutes.¹⁹

While the mean Actual wait time for non-urgent care in the ED has increased, currently it is unclear how closely patient or parent/caretaker expectations for wait time correlates with Actual wait time in non-urgent cases. Accurate knowledge of ED wait time could be an important component considered by patients or parents/caretakers in the decision to utilize other resources for non-urgent care. In the British National Health Service (NHS), wait time is used as a rationing tool for patients needing elective surgery. The NHS comprises about a million or so people on a waiting list for elective surgery. In the NHS, family practitioners refer patients to NHS surgeons. If the surgeon advises the patient to receive elective surgery, the patient is put on the NHS waiting list. At that point, patients decide whether to wait (the average wait for an elective surgery is four months) or to seek private care. The demand for elective surgery is moderated under this system by

¹⁷ V.T. Chande, S.E. Krug, and E.F. Warm, "Pediatric emergency department utilization habits: A consumer survey," *Pediatric Emergency Care*, 12:1 (1996): 29 report that parents/guardians in their study tended to overestimate the severity of illness of their child; Truman and Reutter, 43 report that about half of their sample of parents surveyed were unsure of the seriousness of their child's symptoms.

¹⁸ See Robert W. Derlet, "Overcrowding in Emergency Departments: Increased Demand and Decreased Capacity EDITORIAL," *Annals of Emergency Medicine*, 39:4 (2002): 430-432 and Peter Viccellio, "Emergency Department Overcrowding: An Action Plan," *Academic Emergency Medicine*, 8:2 (2001): 185-187.

¹⁹ McCaig and Ly, *op. cit.*, 4.

patients' own assessment of benefit gained from having elective surgery immediately at a higher out-of-pocket cost versus waiting on the list.²⁰

The ED case differs from the NHS case, however, because in the ED case, an opportunity cost is incurred in the time spent waiting at the ED (whether patients or parents/caretakers expected to wait or not) while waiting in the NHS case does not prevent patients from doing other activities while waiting. The use of wait time as a rationing tool for non-urgent care in the ED is also limited by the uncertainty patients often have about whether their condition is non-urgent. If patients were able to obtain knowledge that their condition was non-urgent (perhaps by consulting their primary care physician first), though, it would follow that similar to the NHS, one component that could sway patients away from utilizing the ED for non-urgent care would be knowledge of ED wait time.

Studies exploring factors behind patient or parental/caretaker reasons for use of the ED for non-urgent care have not examined patient or parental expectation of wait time. This study compared parent/caretaker Expected wait time with Actual wait time and explored whether wait time variables are associated with variables that may be related to the decision making process parents/caretakers use to assess the need to bring their child to the ED for care. To explore this issue, it was first important to establish what wait time expectations were in the parent/caretaker sample. Parents/caretakers were asked to respond to this question in a 30 question survey.

In the first part of this study, to gain an idea about how accurate parents/caretakers were in their wait time expectations, Actual wait time and Expected wait time was determined for each parent/caretaker who completed a questionnaire. The accuracy of parent/caretaker's wait time expectations was then examined using the variable (Actual – Expected) representing the value remaining after Expected wait time was subtracted from Actual wait time. A positive (Actual – Expected) would indicate that parents/caretakers are

²⁰ Stephen Martin and Peter C. Smith, "Rationing by waiting lists: an empirical investigation," *Journal of Public Economics*, 71 (1999): 141-164.

underestimating wait times. A negative (Actual – Expected) would indicate that parents/caretakers are overestimating wait times. A 0 value would indicate that parents/caretakers are expecting wait times equal to Actual wait times.

Parent/caretaker underestimating of wait time in their expectations would be a concern for hospital administrators because previous literature has shown that patient satisfaction is negatively correlated with perceived wait time²¹ especially when perceived wait time is longer than expected.²² Patients or parents/caretakers of patients become more dissatisfied if their perceived wait time is greater than their wait time expectations. Parent/caretaker overestimating of ED wait time could be useful to the extent that it encourages parents/caretakers to seek other sources of care for their child's non-urgent condition. Overestimating of ED wait time would be a concern to health care providers if the overestimate was causing parents/caretakers not to seek any care at all for their child.²³

In the second part of the analysis, possible patterns in parents/caretakers underestimating or overestimating of wait time are examined through bivariate analyses of Actual, Expected, and (Actual – Expected) wait time means. Three categories of variables are examined—Category 1 variables are expected to affect Actual wait time while Category 2 and Category 3 variables are expected to affect Expected wait time.

Category 1 (Current visit)—whether the visit was on a weekday or a weekend, the busyness of the ED at the time, and the nursing triage acuity level the patient is assigned

Variables associated with the current visit were chosen to reflect the ED's assessment of the patient's severity and objective indicators that can influence ED demand.

²¹ Perceived wait time represents the time patients or parents/caretakers sensed themselves to have waited as opposed to the actual wait time they did wait.

²² Andrew Trout, A. Roy Magnusson, Jerris R. Hedges, "Patient Satisfaction Investigations and the Emergency Department: What Does the Literature Say?," *Academic Emergency Medicine*, 7:6 (June 2000): 695-709. Jerris R. Hedges, Andrew Trout, and A. Roy Magnusson, "Satisfied Patients Exiting the Emergency Department (SPEED) Study," *Academic Emergency Medicine*, 9:1 (January 2002): 15-21.

²³ Baker, David W., Stevens Carl D., and Brook, Robert H., "Regular Source of Ambulatory Care and Medical Care Utilization by Patients Presenting to a Public Hospital Emergency Department," *JAMA*, 271:24 (22 June 1994): 1909-1912

These variables represent aspects related to the ED that are expected to significantly affect Actual wait time. Their level of influence on a parent/caretaker's decision to seek ED care depends on how aware parents/caretakers are of the different levels within each variable. It would follow that Expected wait time would vary depending on how aware parents/caretakers are of the variable. For example, a higher busyness level or a lower nursing Triage Acuity Level would generally cause wait time to increase. If parent/caretakers were not aware of busier arrival times or of the acuity level of their child, Expected wait time would not differ amongst different groups within these variables. If they accurately estimated wait time, the (Actual – Expected) value between different levels of each variable would equal 0.

Category 2 (Parent/caretaker) and 3 (Child) variables were chosen to reflect variables that may influence the parent/caretakers' decision to seek ED care. Category 2 variables reflect factors related to the parent while Category 3 variables reflect factors related to the child and his/her medical history or experience with the health system.

Category 2 (Parent/caretaker)—Hispanic vs non-Hispanic, the parent/caretaker rating of the seriousness of the child's condition immediately before arriving at the YNHCH ED, whether the parent/caretaker considered the wait time before arriving at the YNHCH ED, whether the parent/caretaker attempted to contact the child's regular source of care before coming to the ED

Variables associated with the parent/caretaker were chosen to reflect cultural, behavioral, or cognitive differences that may impact the parent/caretaker's decision to seek ED care and may help identify a pattern in parent/caretaker wait time expectations. For example, one may expect that parents/caretakers who considered wait time before arriving at the ED would have more accurate (Actual – Expected) values than parents/caretakers who did not or that they may underestimate the Expected wait time leading to positive values of (Actual – Expected) compared to parents/caretakers who did not consider wait

time before arriving at the ED assuming that long wait time expectations for those who considered wait time would be a deterrent for seeking ED care.

Category 3 (Child)—the child's age, history of chronic illness, health insurance status (Medicaid vs. Non-Medicaid payors), whether the child has a regular source of care, the number of times the child has gone to his/her regular source of care in the last 12 months, the number of times the child has gone to another ED in the last 12 months, and whether the child has been a patient at the YNHCH ED before.

Variables associated with the child were chosen to reflect demographic and medical history related differences in the child that may influence the parent/caretaker's decision to seek ED care and their Expected wait time. For example, one would expect parents/caretakers of children associated with more frequent use of the ED such as those with Medicaid insurance or parents/caretakers of children who had utilized the ED one or more times in the last twelve months to either have a more accurate assessment of wait time and therefore an (Actual – Expected) value closer to 0 or to underestimate the Expected wait time and have a positive (Actual – Expected) value compared to parents/caretakers of children with non-Medicaid insurance or parents/caretakers of children who had utilized the ED in the last 12 months 0 times (assuming that long Expected wait times would act as a deterrent for frequent use of the ED for non-urgent care.) If there is no significant difference between the group who utilized the ED more often than the group who did not utilize the ED as often, or if the (Actual – Expected) value for one of the groups is negative, this would indicate that other factors influencing the parent/caretaker's decision to bring the child to the ED for care outweigh the importance of Expected wait time in the decision.

In the third part of the analysis, using the variables associated with the decision to seek ED care examined in the second part of the analysis, multivariate linear regression modeling was used to determine the independent associations between the variables and Actual, Expected, and (Actual – Expected) wait time. It is hypothesized that Category 1 (Current Visit) variables influence Actual wait time, Category 2 (Parent/caretaker) and

Category 3 (Child) variables influence Expected wait time, and (Actual – Expected) is influenced by variables from a combination of all three categories.

Examining patient or parent/caretaker expectation of wait time could help clarify the extent to which wait time is a factor considered by patients or parents/caretakers of children with non-urgent conditions utilizing the ED. If patients or parents/caretakers underestimate wait times, they may be more likely to utilize the ED instead of utilizing other more appropriate sources of care available to them. Thus, informing patients or parents/caretakers about Actual wait time may help decrease ED overcrowding by preventing use of the ED for non-urgent conditions. Additionally, for patients or parents/caretakers of children with non-urgent conditions who still choose to utilize the ED for care, a better understanding about Actual wait time before arriving at the ED may help decrease dissatisfaction by making it more possible for hospitals to meet their wait time expectations.

Examining whether certain parent/caretaker characteristics as defined by the Category 2 variables are associated with lower Expected wait times than Actual wait times can help target efforts to decrease use of the ED for non-urgent care by informing patients or parents/caretakers in those groups of more accurate wait time estimates that may sway them to go to another source of care. For those who underestimate wait times who still continue to choose the ED as a source for non-urgent care, focusing on making their wait time expectations more accurate to decrease the difference between perceived wait time and Expected wait time could help decrease dissatisfaction. This study aimed to explore whether parents/caretakers of children with non-urgent conditions underestimated wait times or whether certain characteristics or variables linked with parents/caretakers or linked with the child were associated with longer Actual wait times or tendencies to underestimate wait time.

To examine Actual wait times and Expected wait times for non-urgent care in the ED, this study was conducted at the Yale-New Haven Children's Hospital (YNHCH) ED. Questionnaires were given to eligible parents/caretakers to complete in the ED waiting

room or in the examination room before the physician entered to see the patient (“patient” and “child” will be used interchangeably to refer to the patient in this study).

room or in the examination room before the physician entered to see the patient ("patient" and "child" will be used interchangeably to refer to the patient in this study).

Methods

Study Design and Sample

Yale-New Haven Children's Hospital (YNHCH) is a 201-bed hospital a part of Yale-New Haven Hospital, a 944-bed tertiary referral center. The YNHCH Emergency Department is open 24-hours a day and treats over 24,000 children a year. It has 11 examination rooms available, 2 trauma rooms, 2 outer wait rooms, 2 inner wait rooms, and 2 hall spaces. There is one large waiting room for all patients outside of the ED.

All parents/caretakers of patients in YNHCH ED Triage Acuity Level III or IV presenting in each two-hour sample period were eligible to complete the survey. Patient Triage Acuity Level was determined by the triage nurse. Triage Acuity Level III is defined as Stable/Reassessment every 30 minutes: Patients in this category have acute injuries or medical problems, but are comfortable enough to wait > 1 hour to see a physician. Triage Acuity Level IV is defined as Urgent Care Visit/Reassessment every 1-2 hours: Patients in this category do not have a classical medical emergency. The surveying took place over a four-week period from February to March 2003. The survey and study design was approved by the Yale University School of Medicine Human Investigation Committee. The researcher was stationed at the patient triage and registration site in the YNHCH ED. Patient eligibility was identified from nursing intake records. Informed consent to take part in the study was obtained verbally from each parent/caretaker after the triage nurse conducted the initial assessment of the patient and before the patient met with a physician. Participation was voluntary and patient confidentiality was carefully maintained. Parents/caretakers of patients triaged at Acuity Level I or II or who could not complete the English or Spanish versions of the survey were excluded from the study. An information sheet describing the study and research participant rights was given to each parent/caretaker (Appendix I).

The survey was given to parents/caretakers to complete before the patient was assessed by a physician. Parents/caretakers were asked if they preferred the English or the Spanish version. There were no differences in the English or the Spanish versions of the survey questions other than for Q-29 “Are you Hispanic, Latino, or Spanish?” where the term “Spanish” was removed from the Spanish version because its translation (Español) could be taken to mean “person from Spain” of European heritage as opposed to Hispanic or Latino. In cases where the parent/caretaker was holding his/her child, answers were recorded by the researcher as the parent/caretaker stated his/her answer to each question. In cases where the patient was immediately brought back to an examination room, surveys were given to parents/caretakers to complete while they were in the examination room waiting for the physician. Parents/caretakers completed at least the first page of the survey, which included the question concerning parent/caretaker Expected wait time in the ED prior to the physician examining the patient. Parent/caretakers were asked to finish the other questions at their leisure and the surveys were recollected following the physician assessment (Appendix I).

To obtain a randomized sample of parent/caretakers, sample times were assigned using a Random Number Function, RANUNI, in the SAS System. Each day was broken down into twelve two-hour chunks and assigned a number from one to twelve to represent each time period (e.g. 12am-2am, 2am-4am, etc.). A zero was included in the randomization list of numbers to represent skipping that day. The RANUNI command generated a series of random numbers using a seed derived from the time clock. For each day of testing, a random list of numbers was generated. The top number from that list represented the two-hour time slot that would be surveyed that day. If a zero was generated as the top number, no surveying occurred on that day. To reflect the average weekly patient volume seen at the YNHCH ED in the two months preceding the study (See Appendix II, Table 1 and Table 2), the goal was to obtain a sample consisting of 33% of the surveys from the weekend (Saturday or Sunday) and 67% of the surveys from the weekdays (Monday to Friday).

While the goal was to survey all parent/caretakers of patients in Triage Acuity Level III or IV, some parents/caretakers were missed due to the inability of the researcher to speak with the parent/caretaker before a physician began his/her examination of the patient. This would occur at times when the researcher was occupied administering the survey to other parent/caretakers. The total number of patients seen in the two-hour sample time and in the entire day was obtained from the YNHCH ED logbook, which contained a record of all registered patients.

The questionnaire (Appendix I, Part 2) was designed after preliminary surveys were administered to parents/caretakers of patients during a two week trial period. Each parent/caretaker was asked whether s/he understood the questions. The final questionnaire, available in both English and Spanish, consisted of thirty questions contained in two parts. The first part comprised questions to obtain information on the current visit, parent/caretaker perception of the expected wait time for the visit, parent/caretaker perception of the patient's health and parent/caretaker recall of the patient's previous use of providers/sources of care. The second part comprised questions to obtain sociodemographic information on the parent/caretaker such as sex and race. The questionnaire contained a skip pattern where certain questions could be skipped by the parent/caretaker depending on their answer to a prior question. Depending on the skip pattern, a correctly completed survey could contain twenty-two to thirty answered questions. Additional information regarding the patient and the visit was collected by the researcher from the patient's nursing intake sheet and registration sheets. This information included insurance status, birth date, time triaged, discharge time, discharge disposition, and admittance status. A physician reviewer also retrospectively assessed the urgency of the visit using the Nursing Triage Acuity Level Scale explained above (I, II, III, or IV).

Data Measurement

Actual wait times were measured by subtracting the patient triage time from the time the patient entered an examination room. The patient triage time was copied from the patient's triage sheet or from the triage time entered in the YNHCH ED logbook. The time the patient entered the room was copied from the ED dry erase board where the time in room for each patient was listed.

ED busyness (TOTREG) was roughly assessed using the number of patients registered during the two-hour sample period. Nine or more registered patients in a two-hour sample period was considered busy.

Parent/caretaker Expected wait time was taken from answers to the question “**BEFORE** arriving at the Yale Pediatric Emergency Department, how much time did you **EXPECT** your child would have to wait to see a doctor? Give your best guess.”²⁴

(Actual – Expected) was calculated by subtracting the parent/caretaker Expected wait time from the Actual wait time of the patient.

Data Recoding

For questions that asked parents/caretakers to estimate a time, if parents/caretakers wrote answers that stated more than one value (e.g. “2 or 3 hours” or “2-3 hours”), the answers were recoded as the median in between the two values (i.e. 1.5 hours). For questions regarding sources of care, if parents/caretakers wrote in “Primary Care Clinic,” (the clinic associated with Yale-New Haven Hospital) these answers were recoded as “Hospital Clinic.” If parents/caretakers wrote a question mark or “not sure” in response to a question, the answer was recoded as “Don’t Know.” Answers to questions requiring one

²⁴ Q5 of the Questionnaire, See Appendix 1.

answer where parents/caretakers circled two answers were excluded if the answers were contradictory; if the answers were not contradictory, the answer was recoded as “multiple answers circled.” For questions requiring a quantitative answer, if parents/caretakers wrote “a couple,” the answer was recoded as “2”; if parents/caretakers wrote “a few” or “multiple” the answer was excluded. If parents/caretakers answered questions they should have skipped according to their answer to a prior question, those answers were excluded. If parents/caretakers skipped a prior question, but answered questions they would have answered had they answered “yes” to the prior question, the prior question was recoded as “yes” as long as their answers did not include more than one “Don’t Know.” If parents/caretakers skipped a prior question and answered “Don’t Know” to the questions they would have skipped if they had answered “no” to the prior question, both the prior question and the questions they could have skipped were excluded. If parents/caretakers filled in an Expected wait time longer than their estimate of expected total time including wait time²⁵, both answers were excluded. On the question “Would you identify your race as?”²⁶, those who circled “Other” and filled in “Hispanic,” “Puerto Rican,” “Mexican-American,” “Spanish,” “Latino,” and “Mestizo” were recoded as “Hispanic.”

Data Analysis

In the general sample description calculations, the child’s age in months was calculated by subtracting the year of birth from the year of the survey and multiplying the value by 12 months and then adding the total of the month of the survey minus the month of the child’s birth. The child’s age in years was calculated by taking the child’s age in months and dividing by 12.

²⁵ Q6 of the Questionnaire, See Appendix 1.

²⁶ Q30 of the Questionnaire, See Appendix 1.

In the first part of the analysis, unadjusted analyses of individual variables with Actual, Expected, and (Actual – Expected) wait times were performed by conducting T-tests on the three categories of variables to assess each variable's individual impact on Actual wait

Category 1: Current Visit		
Variable Name (Explanation)	Categories	
WKDAY (Day of Week)	Weekday	Weekend
TOTREG (Busyness)	≥9 Registered Patients	<9 Registered Patients
TRIAGE (Nursing Triage Acuity Level)	III	IV

Category 2: Parent/Caretaker		
Variable Name (Explanation)	Categories	
HISPANIC	Yes	No
PSERIOUS (Parent/Caretaker rating of child's condition immediately before arriving at YNHCH ED)	Not Serious	Serious, Very Serious, or Don't Know
WTCONSID (Whether wait time was considered before arriving at YNHCH ED)	Yes	No
REGDRCNT (Did you try to contact your child's regular doctor or clinic before coming to the YNHCH ED?)	Yes	No

Category 3: Child		
Variable Name (Explanation)	Categories	
CHILDAge	≥5	<5
CHRONILL (Any Chronic Illness)	Yes	No
MEDICAID (Health Insurance)	Medicaid	Non-Medicaid
REGMD (Regular Source of Care)	Yes	No
REGDR12M (# of time child has seen Regular Source of Care in last 12 months)	≥3	<3
ANYED12M (# of times child had been brought to any ED in last 12 months)	≥1	<1
PEYALEED (Has child been a patient at YNHCH ED before)	Yes	No

time, Expected wait time, and (Actual – Expected). The variable Categories were 1. Current Visit, 2. Parent/Caretaker, and 3. Child. The variables were grouped as follows—

TABLE 1: Variable Descriptions

Chi-square tests were conducted on categorical variables to assess any associations that may exist between the variables.

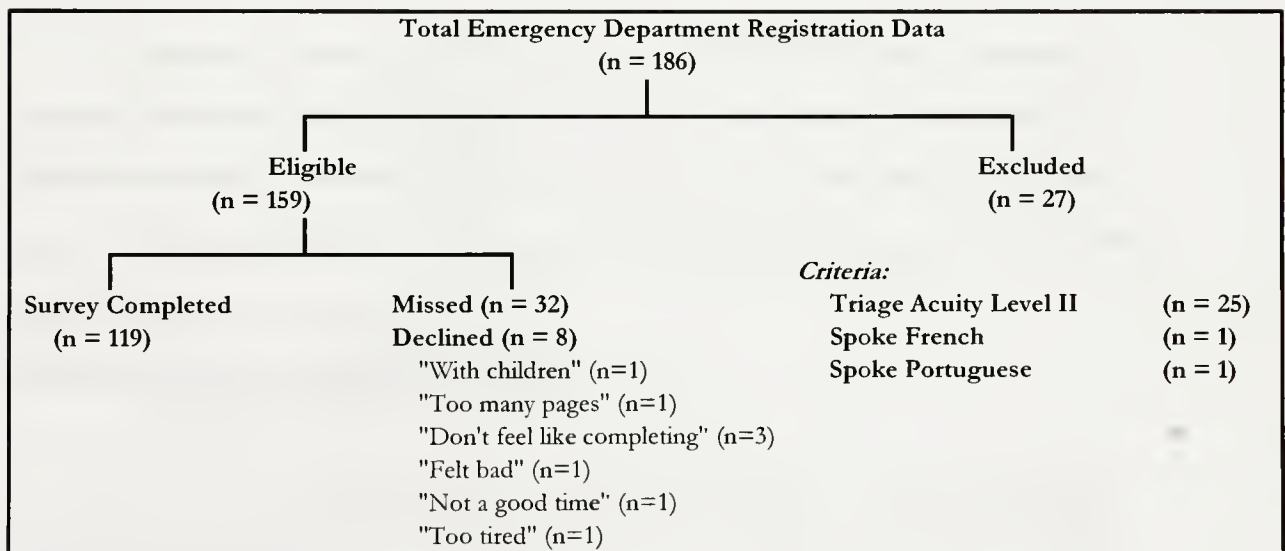
In the second part of the analysis, linear regression models of Actual wait time, Expected wait time, and (Actual – Expected) were calculated. TOTREG, CHILDAGE, REGDR12M, and ANYED12M were examined as continuous variables in the regression models as opposed to the binary categories used in the unadjusted bivariate analyses. Variables hypothesized to be associated with each wait time model were added first to the model. Category 1: Current Visit variables were added to the Actual wait time model first followed by Category 2: Parent/Caretaker variables and then Category 3: Child variables. Category 2: Parent/Caretaker variables were added first to the Expected wait time model and the (Actual – Expected) model followed by Category 3: Child variables and then Category 1: Current visit variables. Any variables in the model within the first added category with a significance of $p > 0.25$ was removed individually to assess the change in the parameter estimates of other variables in its absence. If the removal of the variable changed any of the parameter estimates of the remaining variables (variables that had a significance of $p < 0.25$ in the first model, not including other variables that had a significance of $p > 0.25$) by 15% or more, it was considered a potential confounder and remained in the regression model despite its low significance. If removal of the variable did not change the other parameter estimates by 15% or more, it was not retained in the regression model. The same method of assessing for confounders before removing variables was applied to both the second and third group of variables added to the regression model. Following all three rounds of confounder assessment, QUESLAN, the variable representing whether an English or Spanish version of the questionnaire was filled out, was added to each model control for language differences.

Results

Sample Description

A total of 186 patients sought health care at the Yale Pediatric ED during the study period. 25 patients (13.4% of $n=186$) were triaged at Acuity Level II and therefore excluded from the study. Of the remaining 161 patients triaged at Acuity Level III or IV, 2 parents/caretakers were excluded because they did not speak English or Spanish fluently. 32 parents/caretakers of Acuity Level III or IV patients (19.9% of $n=161$) were missed. 8 (5.0%, $n=161$) parents/caretakers declined. The results below are based on a final sample size of 119 parents/caretakers. (See Figure 1 and Appendix III, Table 1).

FIGURE 1:



Parent/caretaker characteristics are shown in Appendix IV, Table 1 and Table 2. 34.4% of the sample considered themselves to be Hispanic, Latino, or Spanish. Before arriving at the YNHCH ED, a total of 52.9% of parents/caretakers considered how much time their child might have to wait. 23.1% of the sample felt their child's condition was Not Serious.

Child characteristics are shown in Appendix V, Table 1 and Table 2. 36.1% were triaged at Acuity Level IV. A little over half (53.9%) of the sample had a form of Medicaid insurance. The majority of parents/caretakers (95.7%) reported that their child had a regular source of care. Of that group, 52.8% reported trying to contact their child's regular doctor/clinic before coming to the YNHCH ED. A total of 36.8% of parents/caretakers reported that the number of times the child had been brought to an ED in the last 12 months was 0, 49.1% reported that their child had been brought to an ED 1 to 4 times while 6.2% reported that their child had been brought to an ED more than 8 times in the last 12 months.

Mean Unadjusted Wait Times

The mean Actual wait time for all patients with data (n=109) was 42 minutes, std. deviation 40 minutes, range (0:00 to 3:20 hours). The mean Expected wait time for all patients with data (n=113) was 46 minutes, std. deviation 41 minutes, range (0:00 to 4:00 hours). Unadjusted Mean Actual wait time and Unadjusted Mean Expected wait time differ only by 4 minutes. (See Table 2).

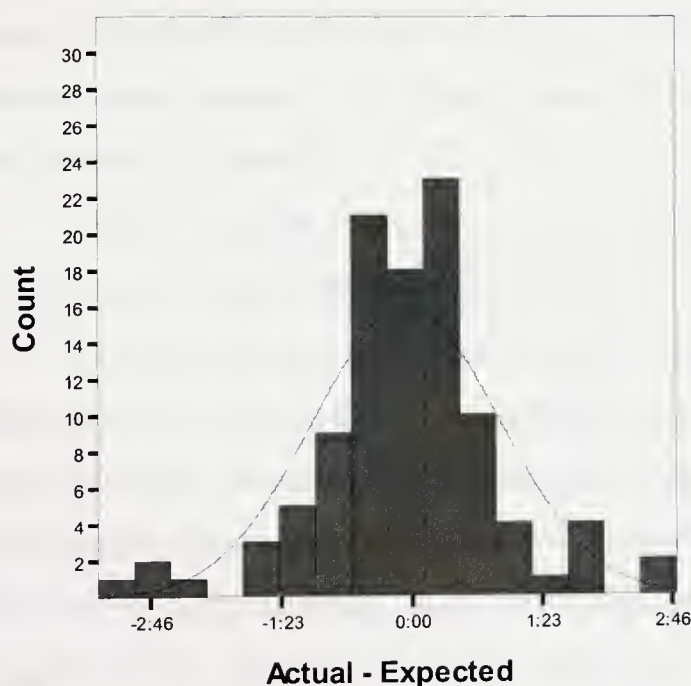
TABLE 2: Wait Time Unadjusted Means

	Actual Wait Time	Expected Wait Time	(Actual - Expected)
N	108	113	104
Missing	11	6	15
Mean	0:42	0:46	-0:04
Std. Deviation	0:40	0:41	1:00
Minimum	0:00	0:00	-3:20
Maximum	3:20	4:00	2:50
Range	3:20	4:00	6:10

The mean (Actual – Expected) time for all patients with data (n=104) was -4 minutes, std. deviation 1 hour, range (-3:20 to 2:50) (See Table 2). The mean (Actual –

Expected) value being close to zero reflects the small difference between the mean Actual wait time and the mean Expected wait time of the entire sample indicating that on average, parent/caretakers' Expected wait times are close to Actual wait times. The frequency distribution of (Actual – Expected) appears fairly normal (Figure 2) indicating that the majority of the sample had Expected wait times within one hour of their Actual wait time. Almost one-fifth of the sample underestimated or overestimated Actual wait time by more than one hour, however. (See Appendix VI for all wait time frequency distributions.)

FIGURE 2: (Actual – Expected) Frequency Distribution



Unadjusted Bivariate Analyses

Actual wait time:

Significant ($p \leq 0.05$) differences in Actual wait time existed within the following variables:

Category 1 variables (Current Visit): TOTREG and TRIAGE. TOTREG represented the total number of patients registered during the 2 hour sample period, which

will be used to represent the busyness of the ED. When TOTREG was greater than 9, the mean Actual wait time was 56 minutes while the mean Actual wait time when TOTREG was less than 9 was 28 minutes ($p=0.000$). TRIAGE represented the nursing Triage Acuity Level of each patient, III representing Acuity Level III patients and IV representing Acuity Level IV patients. The mean Actual wait time for Acuity Level III patients was 34 minutes while the mean Actual wait time for Acuity Level IV patients was 59 minutes ($p=0.002$). (See Appendix VII, Table 1).

Category 2 variables (Parent): HISPANIC. HISPANIC represented the parents/caretakers who answered “yes” to the question “Are you Hispanic, Latino, or Spanish?” The mean Actual wait time for Hispanic parent/caretakers was 54 minutes while the mean Actual wait time for non-Hispanic parent/caretakers was 36 minutes ($p=0.021$). (See Appendix VII, Table 2)

Category 3 variables (Child): There were no significant differences in Actual wait time within these variables. (See Appendix VII, Table 3)

An additional analysis on whether HISPANIC may actually have been associated with TRIAGE or TOTREG showed that HISPANIC is attenuated by TRIAGE. In a linear regression calculated on Actual wait time using HISPANIC as the only independent variable, the Adjusted R-square value of the equation is 0.041 with an F-value of 5.481 ($p=0.021$). HISPANIC increases Actual wait time by 13.5 minutes (or .225 of an hour) ($p=0.021$). When TRIAGE is added as an independent variable with HISPANIC, however, the significance of HISPANIC changes to $p=0.149$. The R-square value of the entire regression, however, moves to Adjusted R-square = 0.119 with an F-value of 8.044 ($p=0.001$). HISPANIC is not attenuated by TOTREG. (See Appendix VIII).

Expected wait time:

Significant differences in Expected wait time existed within the following variables:

Category 1 variables (Current Visit): There were no significant differences in Expected wait time within these variables.

Category 2 variables (Parent): There were no significant differences in Expected wait time within these variables.

Category 3 variables (Child): CHRONILL and MEDICAID. CHRONILL represented patients who had asthma or another chronic illness (Appendix IX, Table 1) according to the parents/caretakers. The mean Expected wait time for parents/caretakers of patients without a chronic illness was 39 minutes while the mean Expected wait time for parents/caretakers of patients with a chronic illness was 1:01 hours ($p=0.029$). MEDICAID represented patients who had Medicaid insurance versus patients who had non-Medicaid insurance. There was a significant difference ($p=0.011$) in the Expected wait times of Parents/caretakers of patients with Medicaid insurance versus parents/caretakers of patients with non-Medicaid insurance. The mean Expected wait time for parents/caretakers of Medicaid patients was 56 minutes while the mean Expected wait time for parents/caretakers of non-Medicaid patients was 35 minutes. (See Appendix XII, Table 2).

An additional analysis on MEDICAID and TRIAGE showed a significant association between patients with Medicaid insurance and triage Acuity Level IV (Chi-Sq = 13.375, $p=0.000$). (See Appendix X, Table 1). The mean number of times Medicaid patients had been to any ED in the last 12 months (1.868 times) was also significantly higher than the mean number of times non-Medicaid patients had been to any ED in the last 12 months (0.628 times) ($p=0.001$). (See Appendix X, Table 2).

(Actual – Expected) wait time:

Significant differences in (Actual – Expected) wait time existed within the following variables:

Category 1 variables (Current Visit): TRIAGE. For TRIAGE, parents/caretakers of Acuity Level III patients had mean (Actual – Expected) wait times of -13 minutes indicating that they overestimated wait time by 13 minutes while parents of Acuity Level IV patients had mean (Actual – Expected) wait times of +15 minutes indicating that they underestimated wait times by 15 minutes ($p=0.023$). (See Appendix VII, Table 1).

Category 2 variables (Parent): WTCONSID. The mean (Actual – Expected) wait time for parents/caretakers who considered wait time before arriving at YNHCH ED was 15 minutes indicating that they overestimated wait time by 15 minutes while the mean (Actual – Expected) wait time for parents/caretakers who did not consider wait time before arriving at YNHCH ED was +9 minutes indicating that they underestimated wait time by 9 minutes ($p=0.038$). (See Appendix VII, Table 2).

Category 3 variables (Child): There were no significant differences in (Actual – Expected) wait time within these variables.

Adjusted Multivariate Linear Regressions

Actual Wait Time

In the Actual Wait Time final model, TOTREG, TRIAGE, ANYED12M, PEYALEED, and HISPANIC appear to be significantly associated with Actual wait time. Actual wait time increased by 24.7 minutes (0.411 of an hour) with every additional patient registered ($p=0.000$), by 20.3 minutes (0.339 of an hour) for Acuity Level IV patients versus Acuity Level III patients ($p=0.012$), and by 18.7 minutes (0.311 of an hour) for patients who had been a patient at the YNHCH ED before ($p=0.023$), and by 18.1 minutes (0.302 of an hour) for Hispanic versus non-Hispanic parents/caretakers ($p=0.054$). Actual wait time decreased by 16.62 minutes (0.277 of an hour) with every additional visit a patient had been to any ED in the 12 months preceding the survey ($p=0.037$). The Adjusted R-square value of the model was 0.287 and the F-value was 3.209 ($p=0.002$). (For Calculations, See Appendix XIa, Tables 1 to 10).

TABLE 3: Multivariate Linear Regression for Actual Wait Time

Model Adjusted R-Square = 0.287		
F-Value = 3.209 (p=0.002)		
Variable	Standardized Coefficients Beta (hours)	P‡
TOTREG*	0.411	0.000
TRIAGE**	0.339	0.012
HISPANIC**	0.302	0.054
WTCONSID	-0.030	0.793
REGDRCNT	0.220	0.086
MEDICAID	-0.272	0.068
ANYED12M**	-0.277	0.037
PEYALEED**	0.311	0.023
CHILDAGE	-0.064	0.587
CHRONILL	-0.112	0.337
REGDR12M	-0.061	0.585
QUESLAN	-0.058	0.695

*p≤0.01

**p≤0.05

Expected Wait Time

In the Expected Wait Time final model, CHRONILL and TOTREG appear to be significantly associated with Expected wait time. Expected wait time increased by 18.3 minutes (0.305 of an hour) for parents/caretakers of patients with a chronic illness ($p=0.021$) and by 17.6 minutes (0.294 of an hour) with every additional patient registered ($p=0.02$). The Adjusted R-square value of the model was 0.189 and the F-value was 2.151 ($p=0.026$). (For Calculations, See Appendix XIb, Tables 11 to 21).

Table 4: Multivariate Linear Regression for Expected Wait Time

Model Adjusted R-Square = 0.189		
F-Value = 2.151 ($p=0.026$)		
Variable	Standardized Coefficients Beta (hours)	P†
PSEIOUS	-0.067	0.571
WTCONSID	0.238	0.07
HISPANIC	0.028	0.872
REGDRCNT	-0.066	0.63
CHRONILL**	0.305	0.021
REGDR12M	-0.153	0.213
ANYED12M	0.257	0.075
CHILDAGE	-0.205	0.108
MEDICAID	0.225	0.168
PEYALEED	-0.053	0.712
TOTREG**	0.294	0.02
TRIAGE	-0.216	0.171
QUESLAN	-0.214	0.206

* $p \leq 0.01$

** $p \leq 0.05$

Actual – Expected

In the (Actual – Expected) final model, CHRONILL, ANYED12M, TRIAGE, and MEDICAID appear to be significantly associated with (Actual – Expected) wait time. (Actual – Expected) decreased by 19.3 minutes (0.321 of an hour) for parents/caretakers of patients with a chronic illness indicating that these parents/caretakers overestimated wait time by 19.3 minutes or expected wait time to be 19.3 minutes longer than actually occurred ($p=0.012$). For every additional ED visit a child may have had in the 12 months preceding the survey, (Actual – Expected) decreased by 22.8 minutes (0.38 of an hour) indicating that

the more times a child had been to an ED, the more parents/caretakers overestimated their wait time or expected a longer wait than actually occurred ($p=0.008$). (Actual – Expected) decreased by 20.4 minutes (0.34 of an hour) for parents/caretakers of patients with Medicaid insurance illness indicating that these parents/caretakers overestimated wait time by 20.4 minutes or expected wait time to be 20.4 minutes longer than actually occurred ($p=0.031$). (Actual – Expected) increased by 24.4 minutes (0.406 of an hour) for parents/caretakers of Acuity Level IV patients compared to Acuity Level III patients indicating that these parents/caretakers underestimated wait time by 24.4 minutes or expected wait time to be 24.4 minutes shorter than actually occurred ($p=0.008$). The Adjusted R-square value of the model was 0.257 and the F-value was 2.786 ($p=0.006$). (For Calculations, See Appendix XIc, Tables 22 to 31).

Table 5: Multivariate Linear Regression for (Actual – Expected) wait time

Model Adjusted R-Square 0.257		
F-Value=2.786 ($p=0.006$)		
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	0.039	0.74
TRIAGE*	0.406	0.008
WTCONSID	-0.221	0.078
HISPANIC	0.183	0.284
REGDRCNT	0.216	0.098
CHRONILL**	-0.321	0.012
MEDICAID**	-0.34	0.031
ANYED12M*	-0.38	0.008
PEYALEED	0.224	0.111
CHILDAGE	0.149	0.228
REGDR12M	0.085	0.469
QUESLAN	0.157	0.347

* $p \leq 0.01$

** $p \leq 0.05$

Discussion

This study examined parent/caretaker expectation of wait time in comparison to Actual wait time. On an aggregate level, the mean Actual wait time and the mean Expected wait time did not differ dramatically. This finding indicates that on a whole, parents of non-urgent patients do not underestimate wait time and, on average, short wait time is not a factor causing parents/caretakers to bring their children to the ED for non-urgent care. However, within different variable groups in the sample, there were significant differences ($p < 0.05$) in Actual, Expected, and (Actual – Expected) wait times in the unadjusted bivariate analyses and significant associations between Actual, Expected, and (Actual – Expected) wait time and certain variables in the adjusted linear regression models. This finding indicates that specific groups of parents/caretakers seem to expect shorter wait times than their Actual wait time.

These findings indicate that large-scale efforts to inform all parents/caretakers about Actual wait time will probably not be an effective manner of decreasing use of the ED for non-urgent care or increasing satisfaction because a number of parents/caretakers already either overestimate or accurately estimate wait time. However, efforts that target specific populations, differentiating amongst the groups, may effectively decrease ED use for non-urgent care or increase satisfaction amongst those groups.

As hypothesized, Actual wait time was most significantly associated with variables related to the ED's assessment of the patient's severity and objective indicators that can influence ED demand. Higher numbers of registered patients and Triage Acuity Level IV (the less urgent triage level) patients were associated with an increase in Actual wait time in both the unadjusted bivariate and adjusted regression analyses. The association between higher numbers of registered patients and higher Actual wait times indicates that as the demand for ED resources rises over the ability of the ED to fulfill the demand, Actual wait time increases. The association between lower urgency and higher Actual wait times reflects

the aim of the YNHCH ED triage system. The triage system is utilized to allocate resources first to patients that need the most immediate attention. The finding that lower urgency Triage Acuity Level IV patients wait longer than Triage Acuity Level III patients attests to the YNHCH ED triage system working to deliver care more quickly to acute patients first.

In addition to the hypothesized variables, however, Actual wait time was also associated with certain variables linked to the parent/caretaker and linked to the child. We will first examine the association between parent/caretakers who identified themselves as Hispanic and Actual wait time. In both the unadjusted bivariate analysis and the adjusted regression model, Hispanic parents/caretakers were associated with longer Actual wait times.

This finding indicates that the variable representing whether the parent/caretaker was Hispanic may have captured aspects of ED busyness not accounted for in the count of the total number of registered patients, the variable used to account for ED busyness in this study. If Hispanic parents/caretakers tended to come to the ED at busier times, their Actual wait time would be longer. It is possible that many Hispanic parents/caretakers were either not aware of times when the ED was busier versus times when the ED had less volume or they were unable to bring their child to the ED for care at a less busy time perhaps due to limitations such as time constraints stemming from their work schedule. It may be beneficial to inform Hispanic parents/caretakers about additional options for non-urgent care or about less busy times to bring their child to the ED for care, such as 8am on weekdays before school or work as opposed to 5pm after work.

Variables linked with the child's medical history that were associated with Actual wait time in the adjusted regression model were the total number of times the child had been to the ED in the 12 months prior to the survey and whether the child had been a patient in the YNHCH ED before. The higher the number of times a child had been to any ED in the 12 months prior to the survey, the lower the Actual wait time. Patients who had previously been to the YNHCH ED were associated with an increase in Actual wait time. These

findings may reflect different interactions between Actual wait time and parent/caretaker ED utilization patterns.

A higher count of the number of times a patient had been to any ED in the 12 months prior to the survey may have been an indicator for identifying parents/caretakers with a higher tendency to bring their child to the ED for non-urgent care. It is possible that parents/caretakers of patients who are frequent users of the ED are more likely to know when the ED is less crowded and then tend to bring their children to the ED to receive care at the less crowded times leading to a decrease in Actual wait time.

While higher counts of the number of times a child had been to the ED in the 12 months prior to the survey were associated with a decrease in Actual wait time, patients who had previously been to the YNHCH ED were associated with increased Actual wait times. Since the question concerning whether a patient had previously been to the YNHCH ED did not contain a quantifiable component, however, it may not have adjusted for lower frequency of ED use. If the parent/caretaker had brought their child to the YNHCH ED only once before, they may not have much of an idea about ED volume trends and when the ED may be most busy. These parents/caretakers may then have brought their children to receive care at the ED at busier times causing their Actual wait time to be higher.

While there is no definite explanation for the associations between these parent/caretaker and child variables and Actual wait time, the apparent patterns in higher or lower Actual wait times and groups within the variables indicate that it may be possible to influence Actual wait time through components linked with the patient or parent/caretaker as opposed to focusing only on components linked to the ED. Further study on knowledge of wait time and ED volume trends within these groups may reveal whether parents/caretakers with an association with shorter Actual wait times actually tend to bring their child to the ED according to their knowledge of wait time. If they do, it may be worthwhile to consider informing other parents/caretakers about ED wait time to at least decrease the tendency of parents/caretakers to bring their child with a non-urgent condition

to the ED during busier times if they have the means to bring their child to seek care at another venue or during less busy times.

Also as hypothesized, the majority of the variables associated with Expected wait time were variables linked to the parent/caretaker or to the child. While higher Expected wait time was found to be associated with higher numbers of patients registered during the sample time, a variable linked to the ED itself, the association may not accurately represent parents/caretakers' ideas on Expected wait time before they arrived at the ED. This association may represent parents/caretakers taking the busyness of the ED into account in their assessment of wait time when they arrived at the ED. Though the question on Expected wait time explicitly asked parents/caretakers to report their Expected wait time before arriving at the ED, inevitably, their answers may have been influenced by the number of people they saw in the waiting room when they arrived. It is therefore difficult to conclusively assert whether parents/caretakers took knowledge about the busyness of the ED into account in their reported (pre-arrival) Expected wait time.

Higher Expected wait time was associated with parents/caretakers of patients who had a chronic illness in both the unadjusted bivariate analysis and the adjusted regression model. The association between increasing Expected wait time and patients with a chronic illness may reflect the greater experience parents/caretakers of these patients may have had in bringing their child to the ED for care perhaps at peak demand times when wait times were generally longer. Their expectation of wait time would then be skewed upwards compared to parents/caretakers of patients with no chronic illness.

This finding has various implications. For parents/caretakers of patients without a chronic illness who may tend to have slightly higher Actual wait times than Expected wait times, it may be beneficial to inform them about realistic Actual wait times. In this study, though these groups had lower wait time expectations than the mean Actual wait time for all patients, it is important to note that the underestimate was not greater than 10 minutes in both groups of parents. For these parents/caretakers, accurate wait time information may

prevent them from utilizing the ED for non-urgent care. Even if accurate accounts of wait time do not prevent their use of the ED for non-urgent care for their child, informing them of Actual wait time could help increase satisfaction. In a study examining whether giving a wait time expectation to non-urgent patients in the ED would affect their satisfaction after the visit, John Mowen, Jane Licata, and Jeannie McPhail (1993) found that though patients were not able to accurately recall whether they had been told an estimated wait time by the nurse before they saw a physician, those that believed they did receive information on Expected wait time were significantly more satisfied with the overall ED experience than those who did not believe they had received any information.²⁷ Their findings indicate that EDs should consider communicating wait time estimates (i.e. through primary care physicians or through pamphlets) because it seems to have the potential to positively impact patient satisfaction. Mowen, Licata, and McPhail note that one cause for the inability of patients to correctly recall whether they had been told an Expected wait time may be related to nurses not having “faithfully followed their directions about giving and not giving waiting time expectations.”²⁸ Therefore, it is possible that informing patients at the time of the visit may actually be a successful way to deliver wait time information to improve patient satisfaction.

As hypothesized, variables significantly associated with (Actual – Expected) wait time were a combination of variables found to be significant in the Actual and Expected wait time regression models. The significant associations between (Actual – Expected) and variables from all three categories in this regression supports the hypothesis that both objective factors influencing the ED’s ability to provide care in a timely fashion to patients and factors that influence the parent/caretaker’s decision making process in deciding to utilize the ED

²⁷ John C. Mowen, Jane W. Licata, and Jeannie McPhail, “Waiting in the Emergency Room: How to Improve Patient Satisfaction,” *Journal of Health Care Marketing*, (Summer 1993): 29 and 30.

²⁸ *Ibid.*, 32.

for non-urgent care for their child contribute to the difference in Actual and Expected wait time.

Parents/caretakers of patients with Triage Acuity Level IV, the lower urgency level, were associated with positive (Actual – Expected) values in both the unadjusted bivariate and the adjusted regression model indicating that they underestimated wait time. This finding was not surprising since it probably reflects parents/caretakers' lack of specialized knowledge on how the ED may triage patients.

In the unadjusted bivariate analysis, parents/caretakers who considered wait time before arriving at the YNHCH ED were associated with a negative mean (Actual – Expected) value indicating that they overestimated wait time. This finding was surprising, but indicates that despite an understanding that wait times may be long, these parents/caretakers still chose to bring their child to the ED perhaps due to the belief that the child's condition warranted the possibly long wait time it might take to receive ED care.

In the adjusted regression model, patients with a chronic illness, patients covered by Medicaid, and the number of times a patient had been to any ED in the last 12 months were associated with negative (Actual – Expected) values indicating that parents/caretakers linked to these variables tended to overestimate wait time. For these parents/caretakers additional information on Actual wait time may not impact their likelihood to utilize the ED or change their satisfaction with ED care since they already expected to wait longer than their Actual wait time. Specifically, for Medicaid patients, previous studies have shown that children covered by Medicaid utilize the ED more often for non-urgent care than non-Medicaid insured patients²⁹ though there is much controversy over this issue.³⁰ In this study, a significant number of patients with Medicaid insurance were triaged at Acuity Level IV

²⁹ See C. DeAngelis, P. Fosarelli, and AK. Duggan, "Use of the emergency department by children enrolled in a primary care clinic," *Pediatric Emergency Care* 1:2(June 1985): 61-5 and Raymond Lucas and Sandra Sanford, "An Analysis of Frequent Users of Emergency Care at an Urban University Hospital," *Annals of Emergency Medicine*, 32:5 (November 1998): 563-568.

³⁰ Halfon (1996) found that insurance status, including Medicaid, had no effect on use of an ED as a usual source of sick care after adjusting for other factors.

indicating that they were utilizing the ED for less urgent care than patients with non-Medicaid insurance (Chi-Sq = 13.375, $p=0.000$). Additionally, the mean number of visits to any ED in the 12 months preceding the survey was almost three times higher for Medicaid patients than for non-Medicaid patients ($p=0.001$). The tendency for parents/caretakers of Medicaid patients to overestimate wait times may imply that while parents/caretakers seem to have an awareness of the possibility of long wait times to the point that they significantly overestimate wait time, parents/caretakers of Medicaid patients still seem to utilize the ED more often for non-urgent care than parents/caretakers of non-Medicaid patients. In their analysis of ED utilization patterns in New York City, John Billings, Nina Parikh, and Tod Mijanovich found that “[i]n 1998, the relative rate of ED use for nonemergent conditions among children with fee-for-service Medicaid coverage was 3.2, compared with 2.2 for patients with private, fee-for-service coverage and 2.8 for self-pay/uninsured children.”³¹ They hypothesize that because Fee-for-service Medicaid patients have no economic impediments to ED use, this contributes to the appearance of more Medicaid covered patients in the ED than at any other venues.³² Therefore, for parents/caretakers of Medicaid patients, the time and psychological costs extensive wait times incur may be counterbalanced by the lack of economic costs utilizing the ED for non-urgent care incurs leading to their increased use of the ED for non-urgent care. Future studies comparing wait time expectation and the financial costs incurred by patients who utilize the ED for non-urgent care could help increase the understanding of how cost and expectation of long wait times might interact.

There are several limitations to this study. First, though parent/caretakers use of the ED for non-urgent care for their children is not unique to the YNHCH ED, the question of the generalizability of the study to other sites cannot be answered without further

³¹ John Billings “Emergency Room Use: The New York Story,” *The Commonwealth Fund Issue Brief*, (November 2000): 5.

³² *Ibid.*, 7.

investigation. Though there were significant differences found within Actual, Expected, and (Actual – Expected) wait time, other significant differences may not have appeared because of the small sample size of $n=119$. Future study designs to examine Actual wait time versus Expected wait time should consider multi-centre surveys conducted in several hospital EDs. While the sample used in this study may have had many more government insured patients than other EDs, all EDs see at least a sub-sample of these patients and therefore the conclusions from this study should still be helpful in highlighting trends in parent/caretaker wait time expectations.

Second, the use of the total number of patients registered in the two hour sample period as a proxy for the measurement for ED busyness in the regression models did not adjust for the acuity of patients registered or the volume of patients already in ED rooms. This may have caused certain sample times that had more acute patients or more patients already in rooms to appear less busy than the busyness level in reality. In general, the total number of patients registered served as an accurate approximation of busyness, though, since there did not seem to be any consistent reason for any particular sample time to have more acute patients or more patients in rooms than other times.

Third, the definition of Actual wait time in this study did not include time the patient waited to see a physician after s/he arrived in the examination room. This should consistently have biased Actual wait time in a negative direction and if parents/caretakers did consider that time it would have biased their answers in a positive direction decreasing the difference between (Actual – Expected). Since there were significant differences in (Actual – Expected) wait times in this sample, the effect of not counting the examination room waiting time seems minimal, but subtle differences in Actual, Expected, and (Actual – Expected) wait times within Category 1, 2, and 3 variables may have been missed. Future research on Actual wait time versus Expected wait time should consider including this time period.

Fourth, parents/caretakers who filled out the survey in the examination room prior to seeing the physician instead of filling it out in the waiting room may have lowered their

Expected wait times due to having the certainty of already being in an examination room. Since the question on Expected wait time specifically asked parents to state what they thought the wait time would be before arriving at the ED, however, it is believed that the majority of parents answering this question, whether they were in the waiting room or the examination room, understood the question and answered accordingly.

Finally, while the ideal goal of researching parent/caretaker expectations would have been to compare the wait time expectations of parents/caretakers of patients with non-urgent conditions who arrived at the ED with those who chose not to utilize the ED for care, this study was unable to assess the wait time expectations of parents/caretakers who did not choose to bring their children into the ED for care or who did not choose to utilize any source of care for their child's condition. While it may not be possible to conduct a study comparing all parents/caretakers including those who chose not to bring their child to any source of care, future research should consider comparing Actual wait times and Expected wait times for parents/caretakers from different medical venues (e.g. EDs, primary care clinics, doctor's offices, etc.)

Knowledge of wait time is only one component among a multitude of reasons interacting in the thought process for parents/caretakers considering which source of care to bring their children to see. The relative importance of wait time in the parents/caretakers' decision process to utilize the ED for non-urgent care may differ amongst different groups. The finding that parents/caretakers of Medicaid patients, who tend to utilize the ED for care more often than non-Medicaid patients, actually expect longer wait times than parents/caretakers of non-Medicaid patients seems to indicate a conscious choice being made on the part of the Medicaid parent/caretaker to seek care from the ED despite the long wait. At what point knowledge of the possible costs incurred from waiting may deter Medicaid parents/caretakers from utilizing the ED for non-urgent care for their children is unclear, but may warrant further exploration to understand why the ED may be more appealing to Medicaid parents/caretakers for non-urgent care.

The finding in this study that certain variables unrelated to the ED were associated with Actual wait time indicate that characteristics linked with particular parent/caretaker characteristics that influence ED utilization tendencies may also affect the likelihood of long or short wait times. The factors influencing Actual wait time, however, differed from those influencing Expected wait time. This dissimilarity implies that attempting to change Actual wait time or Expected wait time will require different programs with different priorities.

Efforts to inform parents/caretakers about times when Actual wait times are generally long may have three positive effects on alleviating ED overcrowding or parent/caretaker dissatisfaction: 1. They could encourage parents/caretakers to seek other sources of care if they can discern that their child's condition is non-urgent and they believe that other sources of care will have shorter wait times, 2. They could lead parent/caretakers to consider bringing their child in to the ED at times when the ED is less busy (e.g. on the weekdays, before 8am), and 3. They could adjust parent/caretaker expectations so that dissatisfaction related to not meeting wait time expectations is decreased. This study shows that such efforts will probably be most effective on Hispanic parents/caretakers, parents/caretakers of patients with no chronic illness, parents/caretakers with non-Medicaid insurance, parents/caretakers of patients triaged at Acuity Level IV, and parents/caretakers of patients who had not been to any ED in the twelve months prior to the survey because they are either associated with longer Actual wait times or they may underestimate wait times.

Most studies on satisfaction and wait time expectations thus far that have found an association between satisfaction and perceived wait time being less than Expected wait time have assessed parent/caretaker or patient expectations after the visit.³³ To the extent that

³³ See Edwin D. Bourdreaux, Roy D. Ary, Cris V. Mandry, and Bhrett McCabe, "Determinants of Patient Satisfaction in a Large Municipal ED: The role of demographic Variables, Visit Characteristics, and Patient Perceptions," *American Journal of Emergency Medicine*, 18:4 (July 2000): 394-400; Nathan D. Magaret, Thomas A. Clark, Craig R. Warden, A. Roy Magnusson, and Jerris R. Hedges, "Patient Satisfaction in the Emergency Department—A Survey of Pediatric Patients and Their Parents," *Academic Emergency Medicine*, 9:12 (December 2002): 1379-1388; Kenneth J. Rhee and Jeanne Bird, "Perceptions and Satisfaction with Emergency Department Care," *The Journal of Emergency Medicine*, 14:6 (1996): 679-

the visit itself with the ED physician or the time lapse between the visit and the data collection may have changed patients or parents/caretakers recall of their Expected wait time before the visit, this study would be affected less so by these possible confounders since parents/caretakers were asked to estimate their expectation of wait time before their child saw a physician. Future research merging these two methods, however, may reveal a more complete picture on the effect of Expected wait time before the visit, perceived wait time during the visit, and satisfaction following the visit.

683; David A. Thompson and Paul R. Yarnold, "Relating Patient Satisfaction to Waiting Time Perceptions and Expectations: The Disconfirmation Paradigm," *Academic Emergency Medicine*, 2:12 (December 1995): 1057-1062; David A. Thompson, Paul R. Yarnold, Diana R. Williams, and Stephen L. Adams, "Effects of Actual Waiting Time, Perceived Waiting Time, Information Delivery, and Expressive Quality on Patient Satisfaction in the Emergency Department," *Annals of Emergency Medicine*, 28:6 (December 1996): 657-665.

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APPENDIX I

INFORMATION SHEET TO BE GIVEN TO STUDY PARTICIPANTS

Yale University Yale-New Haven Children's Hospital

Title: Parent perception of Emergency Department wait time for pediatric patients with non-urgent conditions

Principal Investigator: Emily K. Cheung, MPH (May 2003)

Funding Source: n/a

Invitation to Participate and Description of Project

We are conducting a study regarding Parent/Caretaker perception of Emergency Department wait time for pediatric patients. You are invited to participate because your child has been placed into a category with lower urgency.

If you decide to participate, you will fill out a survey about Emergency Department wait time for pediatric patients. This survey should take 10-12 minutes of your time. Participation in this study is completely voluntary. You can stop at any time.

In order to decide whether or not you wish to be a part of this research study you should know enough about its risks and benefits to make an informed judgment. This form gives you detailed information about the research study which a member of the research team will discuss with you. This discussion should go over all aspects of this research: its purpose, the procedures that will be performed, any risks of the procedures, possible benefits and possible alternative treatments. Once you understand the study, you will be asked if you wish to participate; if so, you will be asked for your verbal consent to take part in this study.

All information collected will be kept confidential in a locked safe. Names and personal identifiers will not be released or entered into any database used in analysis for this study and will not be included in any published materials related to the study. Participation in this study will not affect the care your child will receive in the Emergency Department.

You will not be paid for taking part in this study.

This study has the potential to benefit the hospital's quality of care. This study is not designed to benefit you or your child individually. Your participation in this study can assist in our gaining a better understanding of factors behind Emergency Department overcrowding.

SUMMARY

Completion of this survey is voluntary. It should take about 10-12 minutes of your time. Thank you for participating in this study. If you have any questions or concerns about this study, contact Emily Cheung (emily.cheung@yale.edu) or 203-436-0099.

If you have any questions concerning your rights as a research subject, you may contact the Human Investigation Committee at (203) 785-4688.

HOJA DE INFORMACIÓN PARA LOS PARTICIPANTES DEL ESTUDIO

Yale University Yale-New Haven Children's Hospital

Título: Idea de la madre or el padre sobre el tiempo de espera en la Sala de Emergencia para pacientes pediátricos con condiciones non-urgentes

Investigadora Principal: Emily K. Cheung, MPH (Mayo 2003)

Origen de Financiación: n/a

Invitación para Participar y Descripción del Proyecto

Estamos dirigiendo un estudio sobre la idea de la madre or el padre sobre el tiempo de espera en la Sala de Emergencia para pacientes pediátricos. Usted está invitado a participar porque su niño ha sido evaluado a una categoría de no gravedad.

Si decide participar, Usted llenará una encuesta sobre el tiempo de espera en la Sala de Emergencia para pacientes pediátricos. Esta encuesta debe tomar 10 a 12 minutos de su tiempo. Su participación en este estudio es completamente voluntaria. Usted puede parar en cualquier momento.

Para poder decidir si Usted quiere o no quiere participar en esta investigación, Usted debe saber suficiente de todos los riesgos y beneficios para hacer una decisión bien informada. Este formulario de consentimiento le da información detallada sobre la investigación que un miembro del equipo de la investigación discutirá con Usted. Esta discusión debe hablar de todos los aspectos de esta investigación: su propósito, los procedimientos que serán hechos, cualesquier riesgos de los procedimientos, los beneficios posibles y alternativas posibles para tratamiento. Una vez que Usted entienda el estudio, le preguntarán si desea participar.

Toda la información reunida será mantenida en forma confidencial en una caja de seguridad. Nombres y identificaciones personales no serán liberadas o incluidas en una base de datos usado en el análisis para este estudio e no serán incluidas en cualquier material publicado relacionado con este estudio. Su participación en este estudio no afectará el cuidado que su niño recibirá en la Sala de Emergencia.

Usted no será pagado por participar en este estudio.

Este estudio tiene la posibilidad de beneficiar la calidad de cuidado del hospital. Este estudio no es diseñado para beneficiar a Usted or a su niño individualmente. Su participación en este estudio puede ayudarnos entender mejor los factores detrás de las salas atestadas de personas en la Sala de Emergencia.

Resumen

La terminación de esta encuesta es voluntaria. Debe tomar de 10 a 12 minutos de su tiempo. Gracias por participar en este estudio. Si usted tiene alguna pregunta o algo que le concierna o preocupe, avise Emily Cheung (emily.cheung@yale.edu) o 203-436-0099.

Si usted tiene cualquier pregunta sobre sus derechos como sujeto de investigación, avise la Comisión de Investigaciones Humana al (203) 785-4688.

Questionnaire**Wait time in Yale-New Haven Children's Hospital (Yale Pediatric) Emergency Department****Part I, Information on the child**

Q-1 How did your child get to the Yale Pediatric Emergency Department? (Circle number)

1. Walk-in or Car

2. Ambulance

13. Other (Please fill in): _____

99. Don't know

Q-2 How serious would you rate your child's condition immediately before arriving at the Yale Pediatric Emergency Department? (Circle number)

1. Not serious

2. Serious

3. Very Serious

99. Don't know

Q-3 After you saw the triage nurse, did the triage nurse tell you how much time your child would probably have to wait before seeing a doctor? (Circle number)

1. Yes: (Please fill in) _____ MINUTES (if zero, please write 0)

OR

_____ HOURS (if zero, please write 0)

97. No

Q-4 **BEFORE** arriving at the Yale Pediatric Emergency Department, did you consider how much time your child might have to wait to see a doctor?

1. Yes

2. No

Q-5 **BEFORE** arriving at the Yale Pediatric Emergency Department, how much time did you **EXPECT** your child would have to wait to see a doctor? Give your best guess.
PLEASE FILL IN:

_____ MINUTES (if zero, please write 0) _____ HOURS (if zero, please write 0)

Q-6 **BEFORE** arriving at the Yale Pediatric Emergency Department, how much time total did you **EXPECT** your child would spend in the Emergency Department? (Please include time spent waiting to see a doctor and waiting for medical tests and other services.)
PLEASE FILL IN:

_____ MINUTES (if zero, please write 0) _____ HOURS (if zero, please write 0)

Q-7 Compared to other children your child's age, how would you say your child's overall health is? (Circle number)

1. Excellent
2. Good
3. Fair
4. Poor
99. Don't know

Q-8 Does your child have any of the following chronic conditions? (Circle number)

1. No chronic conditions
2. Yes, Asthma
3. Yes, Diabetes
13. Yes, Other—(Please fill in): _____
99. Don't know

Q-9 Has your child been a patient at the Yale Pediatric Emergency Department before? (Circle number)

1. Yes **(GO TO SECTION A)**
2. No _____
99. Don't know _____

**Skip Section A
and Go to Q-14
on next page**

→ **SECTION A:**

Q-10 When was your child's previous visit to the Yale Pediatric Emergency Department? (Circle number)

1. Less than 1 month ago
2. 1-3 months ago
3. 3-6 months ago
4. 6-9 months ago
5. 9-12 months ago
6. 12+ months ago
99. Don't know

Q-11 For this previous visit, how serious would you rate your child's condition immediately before arriving at the Yale Pediatric Emergency Department? (Circle number)

1. Not serious
2. Serious
3. Very Serious
99. Don't know

Q-12 For this previous visit, when you got to the Yale Pediatric Emergency Department with your child, how long did your child wait to see a doctor? PLEASE FILL IN:

_____ MINUTES (if zero, please write 0) _____ HOURS (if zero, please write 0)

Q-13 For this previous visit, how long was your child's TOTAL time in the Yale Pediatric Emergency Department? PLEASE FILL IN:

_____ MINUTES (if zero, please write 0) _____ HOURS (if zero, please write 0)

Q-14 Does your child have a regular source of care (such as a family doctor, doctors, or clinic)?
(Circle number)

1. Yes (**GO TO SECTION B**)

2. No _____

99. Don't know _____

**Skip SECTION B
and Go to Q-18
on next page**

SECTION B:

Q-15 What is your child's regular source of care?

1. Private physician or physician group

2. Community clinic

3. Hospital Clinic

4. Emergency Department

13. Other—(Please fill in): _____

99. Don't know

Q-16 Did you try to contact (by phone or with an appointment) your child's regular doctor or clinic before coming to the Yale Pediatric Emergency Department today? (Circle number)

1. Yes (**GO TO Q-17**)

2. No _____

99. Don't know _____

**Skip Q-17 and
Go to Q-18
on next page**

Q-17 When you called your child's regular doctor/clinic, what happened? (Circle number)

1. Doctor/clinic recommended child be seen in the Emergency Department

2. Doctor/clinic did not recommend child be seen in the Emergency
Department

3. Doctor/clinic could not be reached

13. Other—(Please fill in): _____

99. Don't know

Q-18 Why did you bring your child to the Yale Pediatric Emergency Department today? (Circle ALL that apply):

1. Child was so sick that he/she required care right away
2. Child's doctor told me to bring my child to the Emergency Department
3. The Emergency Department is closer to my home than the doctor's office
4. It was the quickest way to see a doctor
5. I tried but could not reach my doctor over the phone
6. Child would get the best care at the Emergency Department
7. I don't know how to reach the doctor when the office is closed
8. I had no other place to go
9. The doctor's office/clinic was closed
10. I am dissatisfied with my child's current doctor or clinic
11. The Emergency Department is my child's regular source of care
12. Child does not have health insurance
13. Other—(Please fill in): _____

Q-19 Before arriving at the Yale Pediatric Emergency Department, did you consider taking your child to any other places for care today? (Circle number)

1. Yes (**GO TO Q-20**)
2. No _____
99. Don't know _____

**Skip Q-20 and
Go to Q-21**

→ Q-20 What other places did you consider? (Circle ALL that apply):

1. Another Emergency Department
2. A walk-in medical clinic
3. A family doctor's office
4. A pediatrician's office
13. Other—(Please fill in): _____
99. Don't know

Q-21 If you could not have come to the Yale Pediatric Emergency Department, where would you have gone to get care for your child today? (Circle number)

1. Another Emergency Department
2. A walk-in medical clinic
3. A family doctor's office
4. A pediatrician's office
13. Other—(Please fill in): _____
99. Don't know

Q-22 And at **answer from Q-21**, how long do you think your child would have had to wait to receive care? PLEASE FILL IN:

_____ MINUTES (if zero, please write 0) _____ HOURS (if zero, please write 0)

Q-23 And at **answer from Q-21**, how long do you think your child's TOTAL visit would have taken? PLEASE FILL IN:

_____ MINUTES (if zero, please write 0) _____ HOURS (if zero, please write 0)

Q-24 How many times has your child seen his/her regular doctor or clinic in the last 12 months? (If none, write "0") PLEASE FILL IN:

1. _____ (times)

98. My child does not have a regular doctor or clinic

99. Don't know

Q-25 In the last 12 months, how many times has your child been brought to a Hospital Emergency Department? (Include other Hospital Emergency Departments as well as Yale) (Do NOT include this visit) PLEASE FILL IN:

1. _____ (times)

99. Don't know

Q-26 In the last 12 months, how many times has anyone in your household (NOT including your child) come to any Emergency Department for medical care? PLEASE FILL IN:

1. _____ (times)

99. Don't know

Part II, Caretaker Information

Q-27 You are this child's: (Circle number)

1. Parent or Step-Parent (Mother or Father)

2. Grandparent

3. Aunt or Uncle

4. Other relative

5. Guardian

13. Other—(Please fill in): _____

99. Don't Know

Q-28 What is your sex? (Circle number)

1. Male

2. Female

Q-29 Are you Hispanic, Latino, or Spanish? (Circle number)

1. Yes

2. No

99. Don't know

Q-30 Would you identify your race as? (READ ENTIRE LIST) (Circle number)

1. White

2. Black

3. American Indian, Eskimo, or Aleut

4. Asian or Pacific Islander

5. Multiracial

13. Other—(Optional, Please fill in): _____

99. Don't know

**THAT WAS THE LAST QUESTION.
THANK YOU FOR COMPLETING THIS SURVEY.**

TO BE FILLED OUT BY RESEARCHER

Q-31. Gender of child:

1. Male
2. Female
99. Don't know

Q-32. Birth date of child: _____ [Binder]

Q-33. Insurance type: _____ [Binder]

Q-34. Time triaged: _____ am or pm [Binder]

Q-35. Time patient entered room: _____ am or pm [Board/Logbook]

Q-36. Time patient discharged: _____ am or pm [Logbook]

Q-37 Discharge Disposition [Logbook]

1. Admitted
2. Not Admitted

Q-38 Did patient leave without being seen?

1. yes
2. no

Q-39 Was patient referred to PCC?

1. yes
2. no

Q-40 Did more than 1 adult bring child to ED?

1. Yes
2. No

Q-41 Count of number of patients on board: _____

Q-42 Count of number of binders in ED: _____

Q-44. Patient acuity (from MD): _____

APPENDIX II

Appendix II

TABLE 1:

YNHCH ED December 2002 and January 2003 Volume by Weekday (Monday to Friday) and Weekend (Saturday and Sunday) (Total #)				
		Weekday	Weekend	Total
Week 1:	Dec 2 (M) to Dec 8 (Sun)	330	150	480
Week 2:	Dec 9 (M) to Dec 15 (Sun)	309	150	459
Week 3:	Dec 16 (M) to Dec 22 (Sun)	343	169	512
Week 4:	Dec 23 (M) to Dec 29 (Sun)	326	167	493
Week 5:	Dec 30 (M) to Jan 5 (Sun)	371	144	515
Week 6:	Jan 6 (M) to Jan 12 (Sun)	338	169	507
Week 7:	Jan 13 (M) to Jan 19 (Sun)	359	182	541
Week 8:	Jan 20 (M) to Jan 26 (Sun)	377	190	567
Week 9:	Jan 27 (M) to Feb 2 (Sun)	389	190	579
AVERAGE TOTAL #'S		349	168	517

TABLE 2:

YNHCH ED December 2002 and January 2003 Volume by Weekday (Monday to Friday) and Weekend (Saturday and Sunday) (Total %)				
		Weekday	Weekend	Total
Week 1:	Dec 2 (M) to Dec 8 (Sun)	69%	31%	100%
Week 2:	Dec 9 (M) to Dec 15 (Sun)	67%	33%	100%
Week 3:	Dec 16 (M) to Dec 22 (Sun)	67%	33%	100%
Week 4:	Dec 23 (M) to Dec 29 (Sun)	66%	34%	100%
Week 5:	Dec 30 (M) to Jan 5 (Sun)	72%	28%	100%
Week 6:	Jan 6 (M) to Jan 12 (Sun)	67%	33%	100%
Week 7:	Jan 13 (M) to Jan 19 (Sun)	66%	34%	100%
Week 8:	Jan 20 (M) to Jan 26 (Sun)	66%	34%	100%
Week 9:	Jan 27 (M) to Feb 2 (Sun)	67%	33%	100%
AVERAGE TOTAL %'S		68%	32%	100%

APPENDIX III

Appendix III

Table 1:

Sample Times					
Date	Weekday	Sample Time	Total Patients registered during sample time	Total # Collected	% Total
2/7/2003	Friday	10am-12pm	2	3	2.5%
2/8/2003	Saturday	2pm-4pm	14	12	10.1%
2/9/2003	Sunday	8pm-10pm	9	4	3.4%
2/10/2003	Monday	10pm-12am	7	6	5.0%
2/11/2003	Tuesday	12pm-2pm	5	4	3.4%
2/12/2003	Wednesday	10am-12pm	9	5	4.2%
2/13/2003	Thursday	SKIP	SKIP	N/A	N/A
2/14/2003	Friday	2pm-4pm	5	3	2.5%
2/15/2003	Saturday	4am-6am	1	1	0.8%
2/16/2003	Sunday	8pm-10pm	11	7	5.9%
2/17/2003	Monday	6am-8am	0	0	0.0%
2/18/2003	Tuesday	8pm-10pm	8	6	5.0%
2/19/2003	Wednesday	2pm-4pm	9	6	5.0%
2/20/2003	Thursday	10am-12pm	7	5	4.2%
2/21/2003	Friday	4pm-6pm	15	10	8.4%
2/22/2003	Saturday	6pm-8pm	12	9	7.6%
2/23/2003	Sunday	10am-12pm	7	5	4.2%
2/24/2003	Monday	4pm-6pm	7	5	4.2%
2/25/2003	Tuesday	12pm-2pm	7	4	3.4%
2/26/2003	Wednesday	SKIP	SKIP	N/A	N/A
2/27/2003	Thursday	4pm-6pm	6	3	2.5%
2/28/2003	Friday	8am-10am	3	1	0.8%
3/1/2003	Saturday	10am-12pm	2	1	0.8%
3/2/2003	Sunday	10pm-12am	5	3	2.5%
3/3/2003	Monday	2pm-4pm	7	4	3.4%
3/4/2003	Tuesday	12pm-2pm	10	4	3.4%
3/5/2003	Wednesday	4pm-6pm	11	4	3.4%
3/6/2003	Thursday	8pm-10pm	2	2	1.7%
3/7/2003	Friday	6am-8am	5	2	1.7%
TOTAL			186	119	100.0%

APPENDIX IV

Appendix IV

TABLE 1: Parent/Caretaker Characteristics (n=119)			
	n (%)	Missing from Total (n=119)	
Sex			
Male	25 (21.2)	-	
Female	93 (78.8)	-	
TOTAL	118 (100)	1	
Race			
African-American	28 (25.0)	-	
Asian or Pacific Islander	2 (1.8)	-	
Caucasian	45 (40.2)	-	
Hispanic	27 (24.1)	-	
Other	1 (0.9)	-	
Multiracial	8 (7.1)	-	
Don't Know	1 (0.9)	-	
TOTAL	112 (100)	7	
Are you Hispanic, Latino, or Spanish?			
Yes	43 (37.4%)	-	
No	72 (62.6%)	-	
TOTAL	115 (100)	4	

Appendix IV

TABLE 2: Parent/Caretaker Responses on Visit (self-reported) (n=119)			
		n (%)	Missing from Total (n=119)
Mode of arrival			
	Walk-in	112 (94.1)	-
	Ambulance	7 (5.9)	-
TOTAL		119 (100)	0
Before arriving at the YNHCH ED, did you consider how much time your child might have to wait?			
	Yes	63 (52.9)	-
	No	56 (47.1)	-
TOTAL		119 (100)	0
Before arriving at the YNHCH ED, did you consider taking your child to any other places for care?			
	Yes	31 (27.2)	-
	No	81 (71.1)	-
	Don't Know	2 (1.8)	-
TOTAL		114 (100)	5
Did you try to contact your child's regular doctor or clinic before coming to the YNHCH ED today?			
	Yes	57 (52.8)	-
	No	50 (46.3)	-
	Don't Know	1 (0.9)	-
TOTAL		108 (100)	11*
Seriousness of child's condition?			
	Not Serious	27 (23.1)	-
	Serious	61 (52.1)	-
	Very Serious	7 (6.0)	-
	Don't Know	22 (18.8)	-
TOTAL		117 (100)	2

*Note, 5 of 11 missing did not have a regular source of care

APPENDIX V

Appendix V

TABLE 1: Patient Characteristics (n=119)			
		n (%)	Missing from Total (n=119)
Sex			
	Male	61 (51.3)	-
	Female	58 (48.7)	
	TOTAL	119 (100)	0
Age (Mean 6.3, Std. Deviation 5.6)			
	<5	62 (52.1)	
	≥5	57 (47.9)	
	TOTAL	119 (100)	0
Insurance			
	Medicaid	62 (53.9)	-
	Non-Medicaid	47 (40.9)	
	Self-Pay*	6 (5.2)	
	TOTAL	115 (100)	4**
Nursing Triage Acuity Level			
	III	76 (63.9)	
	IV	43 (36.1)	
	TOTAL	119 (100)	0
LWBS			
	Yes	6 (5.2)	
	No	109 (94.8)	
	TOTAL	115 (100)	4**
Referred to Yale Primary Care Clinic?			
	Yes	4 (3.4)	
	No	115 (96.6)	-
	TOTAL	119 (100)	0
Discharge Disposition			
	Admitted	10 (9.2)	
	Not Admitted	99 (90.8)	
	TOTAL	109 (100)	10***

*Self-Pay does not necessarily indicate "No Insurance." If parent/caretaker lacked information on private insurance coverage, patient registration would list insurance information as "self-pay"

**Missing are 4 referred to PCC

***Missing are 6 LWBS and 4 referred to PCC

Appendix V

TABLE 2: Patient Characteristics according to parent/caretaker response (n=119)		
	n (%)	Missing from Total (n=119)
Child's overall health?		
Excellent	57 (48.3)	
Good	39 (33.1)	
Fair	17 (14.4)	
Poor	2 (1.7)	-
Don't Know	3 (2.5)	
TOTAL	118 (100)	1
Chronic conditions?		
None	84 (72.4)	
Asthma	16 (13.8)	
Other	7 (6.0)	
More than 1 condition	2 (1.7)	
Don't Know	7 (6.0)	-
TOTAL	116 (100)	3
Patient's last visit to the YNHCH ED?		
Never	31 (26.5)	
<1 month ago	15 (12.8)	
1 to 12 months ago	47 (40.2)	
>12 months ago	14 (12.0)	-
Don't Know	10 (8.5)	-
TOTAL	117 (100)	2
Child's regular source of care?		
None	5 (4.3)	
Private physician or physician group	56 (48.3)	
Community or Hospital Clinic	47 (40.5)	
Emergency Department	3 (2.6)	
Other	2 (1.7)	
More than 1 Source of Care	1 (0.9)	
Don't Know	2 (1.7)	
TOTAL	116 (100)	3
# of times child has seen regular doctor in last 12 months?		
0	1 (0.9)	
1≤n≤4	65 (58.6)	
4<n≤8	22 (19.8)	-
8<n≤12	6 (5.4)	
>12	4 (3.6)	
Don't Know	13 (11.7)	-
TOTAL	111 (100)	8
# of times child has been brought to an ED in last 12 months?		
0	42 (36.8)	-
1≤n≤4	56 (49.1)	
4<n≤8	5 (4.4)	
8<n≤12	1 (0.9)	
>12	1 (0.9)	
Don't Know	9 (7.9)	
TOTAL	114 (100)	5

APPENDIX VI

Appendix VI

Figure 1: Actual Wait Time Frequency Distribution

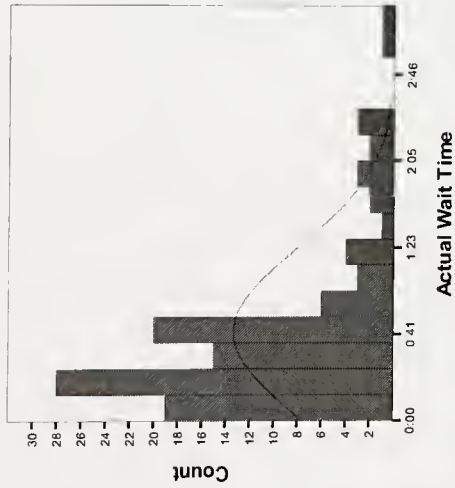


Figure 2: Expected Wait Time Frequency Distribution

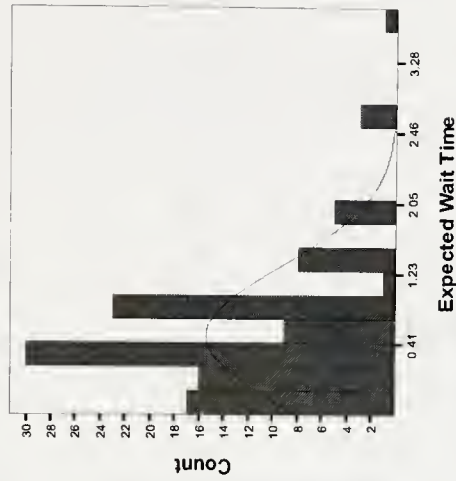
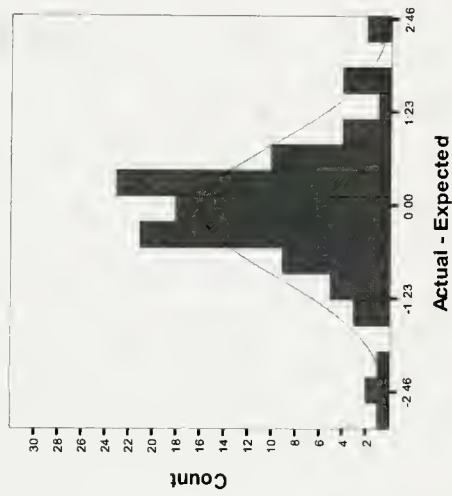


Figure 3: (Actual - Expected) Frequency Distribution



APPENDIX VII

Appendix VII

Table 1: Category 1--Variables associated with the current visit

	Unadj. Mean Actual Wait Time (All patients)	Actual Wait Time (mean)	P†	Unadj. Mean Expected Wait Time (All patients)	Expected Wait Time (mean)	P‡	n	Unadj. Mean Actual- Expected Wait Time (All patients)	Actual - Expected (mean)	Actual - Expected P‡	n
Day of Week											
Weekday	0.42	0:38	0.153	0.46	0:44	0.572	n=71	-0.04	-0:07	0.399	n=68
Weekend		0:49			0:49		n=37		0:02		n=36
TOTREG (Total number registered during sample period)											
≥9 Registered Patients	0.42	0:56*	0.000	0.46	0:50	0.246	n=53	-0.04	0:06	0.095	n=50
<9 Registered Patients		0:28*			0:41		n=55		0:13		n=54
TRIAGE (Nursing Triage Acuity Level)											
III	0.42	0:34*	0.002	0.46	0:46	0.989	n=74	-0.04	-0:13**	0.023	n=71
IV		0:59*			0:46		n=34		0:15**		n=33

*p≤0.01

**p≤0.05

Appendix VII

Table 2: Category 2--Variables associated with the parent

	Unadj. Mean Actual Wait Time (All patients)	Actual Wait Time (mean)	P†	Unadj. Mean Expected Wait Time (All patients)	Expected Wait Time (mean)	Expected Wait Time P†	n	Unadj. Mean Actual-Expected Wait Time (All patients)	Actual - Expected (mean)	Actual - Expected P†	n
HISPANIC (Hispanic vs Not Hispanic)											
Yes	0:42	0:54**	0.021	0:46	0:44	0.846	n=39	-0:04	0:11	0.085	n=36
No		0:36**			0:45		n=66		-0:09		n=65
PSERIOUS (Parent/Caretaker rating of child's condition immediately before arriving at YNHCH ED)											
Not Serious		0:45			0:36		n=24		0:07		n=22
Serious, Very Serious, or Don't Know	0:42	0:41	0.678	0:46	0:49	0.181	n=82	-0:04	-0:06	0.343	n=80
WTCONSID (If Wait Time was considered before arriving at YNHCH ED)											
Yes		0:36			0:51		n=61		-0:15**		n=57
No	0:42	0:49	0.101	0:46	0:39	0.129	n=50	-0:04	0:09**	0.038	n=47
REGDRCNT (Did you try to contact your child's regular doctor or clinic before coming to the YNHCH ED?)											
Yes		0:37			0:49		n=57		-0:11		n=56
No	0:42	0:48	0.199	0:46	0:45	0.641	n=41	-0:04	0:04	0.200	n=37

*p≤0.01

**p≤0.05

Appendix VII

Table 3: Category 3--Variables associated with the child

	Unadj. Mean Actual Wait Time (All patients)	Actual Wait Time (mean)	Actual Wait Time P†	n	Unadj. Mean Expected Wait Time (All patients)	Expected Wait Time (mean)	Expected Wait Time P†	n	Unadj. Mean Actual- Expected Wait Time (All patients)	Actual - Expected (mean)	Actual - Expected P†	n
CHILDDAGE												
≥5	0:42	0:45	0:467	n=53	0:46	0:43	0.536	n=53	-0:04	0:02	0.263	n=50
<5		0:39		n=55		0:48		n=60		-0:10		n=54
CHRONILL (Any Chronic Illness, Asthma or other (See Appendix 7)?)												
No	0:42	0:40	0.378	n=76	0:46	0:39**	0.029	n=79	-0:04	0:00	0.517	n=73
Yes		0:48		n=22		1:01**		n=22		-0:09		n=21
MEDICAID (Health Insurance)												
Non-Medicaid	0:42	0:40	0.569	n=45	0:46	0:35**	0.011	n=46	-0:04	0:04	0.225	n=45
Medicaid		0:44		n=58		0:56**		n=58		-0:11		n=54
REGMD (Regular Source of Care?)												
Yes	0:42	0:41	0.344	n=103	0:46	0:46	0.728	n=108	-0:04	-0:05	0.383	n=99
No		0:59		n=5		0:40		n=5		0:19		n=5
REGDR12M (# of times child has seen regular source of care in last 12 months?)												
≥3	0:42	0:42	0.517	n=58	0:46	0:51	0.539	n=59	-0:04	-0:09	0.817	n=57
<3		0:37		n=32		0:45		n=33		-0:06		n=29
ANYED12M (# of times child has been brought to a hospital ED in last 12 months?)												
≥1	0:42	0:39	0.358	n=38	0:46	0:49	0.580	n=58	-0:04	-0:10	0.348	n=55
<1		0:46		n=39		0:45		n=41		0:01		n=38
PEYALEED (Has child been a patient at YNHCH ED before?)												
Yes	0:42	0:44	0.636	n=74	0:46	0:49	0.137	n=77	-0:04	-0:05	0.576	n=70
No		0:39		n=30		0:36		n=31		0:02		n=30

*p≤0.01

**p≤0.05

Table 1:

	Standardized Coefficients Beta for HSPANIC	HSPANIC beta	Adjusted R Square	F Value	Significance F
Regression: HISPANIC only	0.235	0.031	0.041	1.461	0.021
Regression: HISPANIC + YTHAGE	0.136	0.014	0.116	8.344	0.001
Regression: HISPANIC + YOTHAGE	1104.632	0.01	0.227	26.249	0.000

APPENDIX VIII

Appendix VIII

Table 1:

	Standardized Coefficients Beta for HISPANIC	HISPANIC P†	Adjusted R Square	F-Value	Regression P†
Regression: HISPANIC only	0.225	0.021	0.041	5.481	0.021
Regression: HISPANIC + TRIAGE	0.139	0.149	0.119	8.044	0.001
Regression: HISPANIC + TOTREG	1134.833	0.01	0.227	16.249	0.000

Appendix IX

Table 1:

Chronic illnesses specified in "Cover"	
Illness	Total # mentioned
Scleroderma/ Raynaud's	
Small hole in heart	
Allergies	
Scoliosis	
Reflex	
Liver	

APPENDIX IX

Appendix IX

Table 1:

Chronic Illnesses specified in "Other"	
Illness	Total # reported
Sderoderma/Raynauds	1
Small hole in heart	1
Allergies	1
Seizures	1
Reflex	1
Liver	1

APPENDIX X

Appendix X

Table 1: TRIAGE * MEDICAID Crosstabulation

Count		MEDICAID		Total
		Non-Medicaid Insurance	Medicaid Insurance	
TRIAGE	Triage Acuity Level III	40	32	72
	Triage Acuity Level IV	7	30	37
	Total	47	62	109

Chi-Sq = 13.375

2-sided Sig = 0.000

Table 2: MEDICAID vs. ANYED12M

	Unadjusted Mean # of times child has been to any ED in last 12 months	# of times child has been to any ED in last 12 months (mean)	P†	n
Medicaid	1.581	1.868	0.001	53
Non-Medicaid		0.628		43

APPENDIX XI

Appendix Xla

Actual Wait Time Regression Notes

Table 1: All Category 1 variables added

Model Adjusted R-Square		0.239
F-Value	(p=0.000)	12.199
Variable	Standardized Coefficients Beta (hours)	P†
WKDAY	0.011	0.904
TOTREG	0.415	0.000
TRIAGE	0.252	0.004

WKDAY has $p > 0.25$

Table 2a: Remove Weekday

Model Adjusted R-Square		0.239
F-Value	p=0.000	12.199
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	0.418	0
TRIAGE	0.252	0.004

Table 2b: Assess change in TOTREG and TRIAGE parameter estimates

Variable	Coefficient in Base regression	Coefficient in Regression w/out WKDAY	Δ in Coefficient (%)	Δ Greater than 15%?
TOTREG	0.415	0.418	1%	N
TRIAGE	0.252	0.252	0%	N

WKDAY does not change any of the base variables by more than 15%, it is probably not a confounder and will not be included in the Actual Wait Time regression

Table 3: Add Category 2 variables

Model Adjusted R-Square		0.201
F-Value	p=0.000	4.811
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	0.359	0
TRIAGE	0.209	0.042
HISPANIC	0.137	0.166
WTCONSID	-0.133	0.18
PSERIOUS	0.058	0.553
REGDRCNT	0.008	0.939

PSERIOUS and REGDRCNT have $p > 0.25$

Appendix Xla

Table 4a: Remove PSERIOUS (leave REGDRCNT in for analysis)

Model Adjusted R-Square		0.213
F-Value	p=0.000	6.036
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	0.348	0
TRIAGE	0.213	0.036
HISPANIC	0.139	0.152
WTCONSID	-0.121	0.212
REGDRCNT	-0.007	0.943

Table 4b: Assess change in other variables' parameter estimates, not including REGDRCNT

Variable	Coefficient in Base regression	Coefficient in Regression w/out PSERIOUS	Δ in Coefficient (%)	Δ Greater than 15%?
TOTREG	0.359	0.348	-3%	N
TRIAGE	0.209	0.213	2%	N
HISPANIC	0.137	0.139	1%	N
WTCONSID	-0.133	-0.121	-9%	N
REGDRCNT	0.008	-0.007	-188%	N/A*

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether PSERIOUS is a confounder

PSERIOUS does not change any of the base variables by more than 15%, it is probably not a confounder and will not be included in the Actual Wait Time regression.

Table 5a: Remove REGDRCNT, (leave PSERIOUS in for analysis)

Model Adjusted R-Square		0.213
F-Value	6.036	p=0.000
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	0.404	0.000
TRIAGE	0.231	0.011
HISPANIC	0.151	0.090
WTCONSID	-0.093	0.279
PSERIOUS	0.073	0.405

Appendix Xla

Table 5b: Assess change in other variables' parameter estimates, not including PSERIOUS

Variable	Coefficient in Base regression	Coefficient in Regression w/out REGDRCNT	Δ in Coefficient from base value (%)	Δ Greater than 15%?
TOTREG	0.359	0.404	13%	N
TRIAGE	0.209	0.231	11%	N
HISPANIC	0.137	0.151	10%	N
WTCONSID	-0.133	-0.093	-30%	Y
PSERIOUS	0.058	0.073	26%	N/A*

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether REGDRCNT is a confounder

REGDRCNT may confound WTCONSID and will remain in regression for Actual Wait Time

Table 6: Add Category 3 variables

Model Adjusted R-Square		0.298
F-Value	p=0.001	3.541
Variable	Standardized Coefficients Beta (hours)	P‡
TOTREG	0.412	0.000
TRIAGE	0.344	0.010
HISPANIC	0.267	0.036
WTCONSID	-0.023	0.838
REGDRCNT	0.214	0.090
CHILDAGE	-0.062	0.594
CHRONILL	-0.117	0.310
MEDICAID	-0.278	0.059
REGDR12M	-0.058	0.600
ANYED12M	-0.285	0.030
PEYALEED	0.31	0.022

Of the Category 3 variables CHILDAGE, CHRONILL, and REGDR12M have $p > 0.25$

Appendix X1a

Table 7a: Remove CHILDAGE, (leave CHRONILL and REGDR12M in for analysis)

Model Adjusted R-Square		0.306
F-Value	3.916	p=0.000
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	0.400	0.000
TRIAGE	0.363	0.005
HISPANIC	0.274	0.029
WTCONSID	-0.027	0.812
REGDRCNT	0.224	0.070
CHRONILL	-0.125	0.268
MEDICAID	-0.282	0.053
REGDR12M	-0.048	0.661
ANYED12M	-0.286	0.028
PEYALEED	0.314	0.019

Table 7b: Assess change in other variables' parameter estimates, not including CHRONILL or REGDR12M

Variable	Coefficient in Base regression	Coefficient in Regression w/out CHILDAGE	Δ in Coefficient from base value (%)	Δ Greater than 15%?
TOTREG	0.412	0.4	-3%	N
TRIAGE	0.344	0.363	6%	N
HISPANIC	0.267	0.274	3%	N
WTCONSID	-0.023	-0.027	17%	Y
REGDRCNT	0.214	0.224	5%	N
CHRONILL	-0.117	-0.125	7%	N/A*
MEDICAID	-0.278	-0.282	1%	N
REGDR12M	-0.058	-0.048	-17%	N/A*
ANYED12M	-0.285	-0.286	0%	N
PEYALEED	0.31	0.314	1%	N

*Indicates variable that also has a p>0.25 in base regression. Changes in this variable will not be used to assess whether CHILDAGE is a confounder

CHILDAGE may confound WTCONSID and will remain in regression for Actual Wait Time

Appendix Xla

Table 8a: Remove CHRONILL, (leave CHILDAGE and REGDR12M)

Model Adjusted R-Square		0.232
F-Value	3.145	p=0.003
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	0.397	0.001
TRIAGE	0.278	0.031
HISPANIC	0.193	0.124
WTCONSID	-0.088	0.431
REGDRCNT	0.063	0.598
MEDICAID	-0.203	0.144
REGDR12M	0.014	0.898
ANYED12M	-0.241	0.061
PEYALEED	0.137	0.275
CHILDAGE	-0.13	0.259

Table 8b: Assess change in other variables' parameter estimates, not including CHILDAGE or REGDR12M

Variable	Coefficient in Base regression	Coefficient in Regression w/out CHRONILL	Δ in Coefficient from base value (%)	Δ Greater than 15%?
TOTREG	0.412	0.397	-4%	N
TRIAGE	0.344	0.278	-19%	Y
HISPANIC	0.267	0.193	-28%	Y
WTCONSID	-0.023	-0.088	283%	Y
REGDRCNT	0.214	0.063	-71%	Y
MEDICAID	-0.278	-0.203	-27%	Y
REGDR12M	-0.058	0.014	-124%	N/A*
ANYED12M	-0.285	-0.241	-15%	Y
PEYALEED	0.31	0.137	-56%	Y
CHILDAGE	-0.062	-0.13	110%	N/A*

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether CHRONILL is a confounder

CHRONILL may confound TRIAGE, HISPANIC, WTCONSID, REGDRCNT, MEDICAID, ANYED12M, PEYALEED and will remain in the regression for Actual Wait Time

Appendix Xla

Table 9a: Remove REGDR12M, leave CHILDAGE and CHRONILL

Model Adjusted R-Square		0.206
F-Value	2.895	p=0.005
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	0.315	0.006
TRIAGE	0.325	0.013
HISPANIC	0.216	0.094
WTCONSID	-0.128	0.251
REGDRCNT	0.083	0.495
MEDICAID	-0.213	0.132
ANYED12M	-0.231	0.075
PEYALEED	0.153	0.241
CHILDAGE	-0.006	0.961
CHRONILL	-0.052	0.653

Table 9b: Assess change in other variables' parameter estimates, not including CHILDAGE or CHRONILL

Variable	Coefficient in Base regression	Coefficient in Regression w/out REGDR12M	Δ in Coefficient from base value (%)	Δ Greater than 15%?
TOTREG	0.412	0.315	-24%	Y
TRIAGE	0.344	0.325	-6%	N
HISPANIC	0.267	0.216	-19%	Y
WTCONSID	-0.023	-0.128	457%	Y
REGDRCNT	0.214	0.083	-61%	Y
MEDICAID	-0.278	-0.213	-23%	Y
ANYED12M	-0.285	-0.231	-19%	Y
PEYALEED	0.31	0.153	-51%	Y
CHILDAGE	-0.062	-0.006	-90%	N/A*
CHRONILL	-0.117	-0.052	-56%	N/A*

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether REGDR12M is a confounder

REGDRCNT may confound TOTREG, HISPANIC, WTCONSID, REGDRCNT, MEDICAID, ANYED12M, and PEYALEED and will remain in the Actual Wait Time regression

Appendix Xla

Table 10: Add QUESLAN for FINAL regression

Model Adjusted R-Square		0.287
F-Value	3.209	p=0.002
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG*	0.411	0.000
TRIAGE**	0.339	0.012
HISPANIC**	0.302	0.054
WTCONSID	-0.030	0.793
REGDRCNT	0.220	0.086
MEDICAID	-0.272	0.068
ANYED12M**	-0.277	0.037
PEYALEED**	0.311	0.023
CHILDAGE	-0.064	0.587
CHRONILL	-0.112	0.337
REGDR12M	-0.061	0.585
QUESLAN	-0.058	0.695

*p≤0.01

**p≤0.05

Appendix Xlb

Expected Wait Time Regression Notes

Table 11: All Category 1 variables added

Model Adjusted R-Square		0.006
F-Value	p=0.341	1.144
Variable	Standardized Coefficients Beta (hours)	P†
HISPANIC	-0.005	0.965
PSERIOUS	-0.161	0.123
WTCONSID	0.167	0.125
REGDRCNT	-0.005	0.963

HISPANIC and REGDRCNT have $p > 0.25$

Table 12a: Remove HISPANIC, (leave in REGDRCNT for analysis)

Model Adjusted R-Square		0.033
F-Value	p=0.103	2.118
Variable	Standardized Coefficients Beta (hours)	P†
PSERIOUS	-0.167	0.098
WTCONSID	0.201	0.054
REGDRCNT	0.001	0.996

Table 12b: Assess change in PSERIOUS and WTCONSID

Variable	Coefficient in Base regression	Coefficient in Regression w/out HISPANIC	Δ in Coefficient (%)	Δ Greater than 15%?
PSERIOUS	-0.161	-0.167	4%	N
WTCONSID	0.167	0.201	20%	Y
REGDRCNT	-0.005	0.001	-120%	N/A*

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether HISPANIC is a confounder

HISPANIC may confound WTCONSID and will remain in regression for Expected Wait Time

Table 13a: Remove REGDRCNT, (leave HISPANIC)

Model Adjusted R-Square		0.000
F-Value	p=0.103	2.118
Variable	Standardized Coefficients Beta (hours)	P†
PSERIOUS	-0.133	0.176
WTCONSID	0.115	0.242
HISPANIC	-0.014	0.886

Appendix XIb

Table 13b: Assess change in PSERIOUS and WTCONSID

Variable	Coefficient in Base regression	Coefficient in Regression w/out REGDRCNT	Δ in Coefficient (%)	Δ Greater than 15%?
PSERIOUS	-0.161	-0.133	-17%	Y
WTCONSID	0.167	0.115	-31%	Y
HISPANIC	-0.005	-0.014	180%	N/A*

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether REGDRCNT is a confounder

REGDRCNT may confound PSERIOUS and WTCONSID and will remain in regression for Expected Wait Time

Table 14: Add Category 3 variables

Model Adjusted R-Square		0.12
F-Value	p=0.070	1.873
Variable	Standardized Coefficients Beta (hours)	P‡
PSERIOUS	-0.116	0.339
WTCONSID	0.278	0.031
HISPANIC	-0.163	0.24
REGDRCNT	-0.102	0.459
CHILDAGE	-0.143	0.256
CHRONILL	0.344	0.011
MEDICAID	0.141	0.369
REGDR12M	-0.158	0.214
ANYED12M	0.206	0.15
PEYALEED	-0.049	0.744

Of the Category 3 variables, CHILDAGE, MEDICAID, and PEYALEED had $p > 0.25$

Table 15a: Remove CHILDEAGE, (leave MEDICAID and PEYALEED)

Model Adjusted R-Square		0.115
F-Value	p=0.067	1.923
Variable	Standardized Coefficients Beta (hours)	P‡
PSERIOUS	-0.103	0.394
WTCONSID	0.261	0.042
HISPANIC	-0.141	0.307
REGDRCNT	-0.084	0.537
CHRONILL	0.319	0.017
MEDICAID	0.148	0.347
REGDR12M	-0.131	0.294
ANYED12M	0.214	0.136
PEYALEED	-0.043	0.773

Appendix Xlb

Table 15b: Assess change in other variables' parameter estimates, not MEDICAID or PEYALEED

Variable	Coefficient in Base regression	Coefficient in Regression w/out CHILDAGE	Δ in Coefficient (%)	Δ Greater than 15%?
PSERIOUS	-0.116	-0.103	-11%	N
WTCONSID	0.278	0.261	-6%	N
HISPANIC	-0.163	-0.141	-13%	N
REGDRCNT	-0.102	-0.084	-18%	Y
CHRONILL	0.344	0.319	-7%	N
MEDICAID	0.141	0.148	5%	N/A*
REGDR12M	-0.158	-0.131	-17%	Y
ANYED12M	0.206	0.214	4%	N
PEYALEED	-0.049	-0.043	-12%	N/A*

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether CHILDAGE is a confounder

CHILDAGE may confound REGDRCNT and REGDR12M and will remain in regression for Expected Wait Time

Table 16a: Remove MEDICAID, (leave CHILDAGE and PEYALEED)

Model Adjusted R-Square		0.128
F-Value	p=0.041	2.121
Variable	Standardized Coefficients Beta (hours)	P†
PSERIOUS	-0.091	0.426
WTCONSID	0.331	0.009
HISPANIC	-0.112	0.362
REGDRCNT	-0.061	0.627
CHRONILL	0.337	0.007
REGDR12M	-0.172	0.157
ANYED12M	0.227	0.084
PEYALEED	0.044	0.74
CHILDAGE	-0.112	0.354

Appendix Xlb

Table 16b: Assess change in other variables' parameter estimates, not CHLDAGE or PEYALEED

Variable	Coefficient in Base regression	Coefficient in Regression w/out MEDICAID	Δ in Coefficient (%)	Δ Greater than 15%?
PSEIOUS	-0.116	-0.091	-22%	Y
WTCONSID	0.278	0.331	19%	Y
HISPANIC	-0.163	-0.112	-31%	Y
REGDRCNT	-0.102	-0.061	-40%	Y
CHLDAGE	-0.143	-0.112	-22%	N/A*
CHRONILL	0.344	0.337	-2%	N
REGDR12M	-0.158	-0.172	9%	N
ANYED12M	0.206	0.227	10%	N
PEYALEED	-0.049	0.044	-190%	N/A*

MEDICAID may confound PSEIOUS, WTCONSID, HISPANIC, and REGDRCNT and will remain in regression for Expected Wait Time

Table 17a: Remove PEYALEED, (leave CHLDAGE and MEDICAID)

Model Adjusted R-Square		0.105
F-Value	p=0.080	1.845
Variable	Standardized Coefficients Beta (hours)	P†
PSEIOUS	-0.12	0.319
WTCONSID	0.238	0.058
HISPANIC	-0.199	0.152
REGDRCNT	-0.057	0.661
CHRONILL	0.289	0.026
REGDR12M	-0.114	0.367
ANYED12M	0.136	0.302
CHLDAGE	-0.153	0.229
MEDICAID	0.217	0.151

Appendix Xlb

Table 17b: Assess change in other variables' parameter estimates, not CHLDAGE or MEDICAID

Variable	Coefficient in Base regression	Coefficient in Regression w/out PEYALEED	Δ in Coefficient (%)	Δ Greater than 15%?
PSERIOUS	-0.116	-0.12	3%	N
WTCONSID	0.278	0.238	-14%	N
HISPANIC	-0.163	-0.199	22%	Y
REGDRCNT	-0.102	-0.057	-44%	Y
CHLDAGE	-0.143	-0.153	7%	N/A*
CHRONILL	0.344	0.289	-16%	Y
MEDICAID	0.141	0.217	54%	N/A*
REGDR12M	-0.158	-0.114	-28%	Y
ANYED12M	0.206	0.136	-34%	Y

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether PEYALEED is a confounder

PEYALEED may confound HISPANIC, REGDRCNT, CHRONILL, REGDR12M, and ANYED12M and will remain in regression for Expected Wait Time

Table 18: Add Category 1 variables

Model Adjusted R-Square		0.164
F-Value	p=0.044	1.967
Variable	Standardized Coefficients Beta (hours)	P†
PSERIOUS	-0.078	0.514
WTCONSID	0.279	0.033
HISPANIC	-0.114	0.406
REGDRCNT	-0.092	0.504
CHRONILL	0.294	0.028
REGDR12M	-0.151	0.233
ANYED12M	0.228	0.115
CHLDAGE	-0.211	0.126
MEDICAID	0.184	0.257
PEYALEED	-0.054	0.711
WKDAY	-0.032	0.825
TOTREG	0.3	0.04
TRIAGE	-0.165	0.285

Of the Category 1 variables, WKDAY and TRIAGE have $p > 0.25$

Appendix Xlb

Table 19a: Remove WKDAY, (leave TRIAGE for analysis)

Model Adjusted R-Square		0.179
F-Value	p=0.028	2.167
Variable	Standardized Coefficients Beta (hours)	P†
PSERIOUS	-0.077	0.517
WTCONSID	0.283	0.028
HISPANIC	-0.112	0.408
REGDRCNT	-0.09	0.511
CHRONILL	0.297	0.025
REGDR12M	-0.146	0.237
ANYED12M	0.23	0.108
CHILDAGE	-0.201	0.117
MEDICAID	0.185	0.249
PEYALEED	-0.055	0.706
TOTREG	0.285	0.024
TRIAGE	-0.163	0.284

Table 19b: Assess change in other variables' parameter estimates, not TRIAGE

Variable	Coefficient in Base regression	Coefficient in Regression w/out WKDAY	Δ in Coefficient (%)	Δ Greater than 15%?
PSERIOUS	-0.078	-0.077	-1%	N
WTCONSID	0.279	0.283	1%	N
HISPANIC	-0.114	-0.112	-2%	N
REGDRCNT	-0.092	-0.09	-2%	N
CHRONILL	0.294	0.297	1%	N
REGDR12M	-0.151	-0.146	-3%	N
ANYED12M	0.228	0.23	1%	N
CHILDAGE	-0.211	-0.201	-5%	N
MEDICAID	0.184	0.185	1%	N
PEYALEED	-0.054	-0.055	2%	N
TOTREG	0.3	0.285	-5%	N
TRIAGE	-0.165	-0.163	-1%	N/A*

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether WKDAY is a confounder

WKDAY does not change any of the base variables by more than 15%, it is probably not a confounder and will not be included in the Actual Wait Time regression

Appendix Xlb

Table 20a: Remove TRIAGE, (leave WKDAY for analysis)

Model Adjusted R-Square		0.162
F-Value	p=0.040	2.027
Variable	Standardized Coefficients Beta (hours)	P†
PSEIOUS	-0.069	0.563
WTCONSID	0.308	0.017
HISPANIC	-0.13	0.343
REGDRCNT	-0.063	0.644
CHRONILL	0.299	0.026
REGDR12M	-0.147	0.246
ANYED12M	0.191	0.173
CHILDAGE	-0.171	0.198
MEDICAID	0.127	0.407
PEYALEED	-0.029	0.839
TOTREG	0.276	0.055
WKDAY	-0.026	0.859

Table 20b: Assess change in other variables' parameter estimates, not WKDAY

Variable	Coefficient in Base regression	Coefficient in Regression w/out TRIAGE	Δ in Coefficient (%)	Δ Greater than 15%?
PSEIOUS	-0.078	-0.069	-12%	N
WTCONSID	0.279	0.308	10%	N
HISPANIC	-0.114	-0.13	14%	N
REGDRCNT	-0.092	-0.063	-32%	Y
CHRONILL	0.294	0.299	2%	N
REGDR12M	-0.151	-0.147	-3%	N
ANYED12M	0.228	0.191	-16%	Y
CHILDAGE	-0.211	-0.171	-19%	Y
MEDICAID	0.184	0.127	-31%	Y
PEYALEED	-0.054	-0.029	-46%	Y
WKDAY	-0.032	-0.026	-19%	N/A*
TOTREG	0.3	0.276	-8%	N

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether TRIAGE is a confounder

TRIAGE may confound REGDRCNT, ANYED12M, CHILDAGE, MEDICAID, PEYALEED and will remain in regression for Expected Wait Time

Appendix Xlb

Table 21: Add QUESLAN for Final Regression

Model Adjusted R-Square		0.189
F-Value	p=0.026	2.151
Variable	Standardized Coefficients Beta (hours)	P†
PSERIOUS	-0.067	0.571
WTCONSID	0.238	0.07
HISPANIC	0.028	0.872
REGDRCNT	-0.066	0.63
CHRONILL**	0.305	0.021
REGDR12M	-0.153	0.213
ANYED12M	0.257	0.075
CHILDAGE	-0.205	0.108
MEDICAID	0.225	0.168
PEYALEED	-0.053	0.712
TOTREG**	0.294	0.02
TRIAGE	-0.216	0.171
QUESLAN	-0.214	0.206

*p≤0.01

**p≤0.05

Appendix Xlc

(Actual - Expected) Regression Notes

Table 22: All Category 1 variables added

Model Adjusted R-Square		0.046
F-Value	p=0.054	2.637
Variable	Standardized Coefficients Beta (hours)	P†
WKDAY	0.037	0.711
TOTREG	0.139	0.172
TRIAGE	0.206	0.036

WKDAY has $p > 0.25$

Table 23a: Remove Weekday

Model Adjusted R-Square		0.054
F-Value	p=0.023	3.920
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	0.15	0.122
TRIAGE	0.206	0.035

Table 23b: Assess change in TOTREG and TRIAGE parameter estimates

Variable	Coefficient in Base regression	Coefficient in Regression w/out WKDAY	Δ in Coefficient (%)	Δ Greater than 15%?
TOTREG	0.139	0.15	8%	N
TRIAGE	0.206	0.206	0%	N

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether WKDAY is a confounder

WKDAY does not change any of the base variables by more than 15%, it is probably not a confounder and will not be included in the Actual Wait Time regression

Table 24: Add Category 2 variables

Model Adjusted R-Square		0.066
F-Value	p=0.073	2.018
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	0.098	0.37
TRIAGE	0.182	0.117
HISPANIC	0.088	0.423
PSERIOUS	0.086	0.426
WTCONSID	-0.217	0.047
REGDRCNT	-0.015	0.894

Of the Category 2 variables, HISPANIC, PSERIOUS, and REGDRCNT have $p > 0.25$

Appendix Xlc

Table 25a: Remove HISPANIC, (leave PSERIOUS and REGDRCNT)

Model Adjusted R-Square		0.065
F-Value	p=0.056	2.253
Variable	Standardized Coefficients Beta (hours)	P‡
TOTREG	0.107	0.309
TRIAGE	0.129	0.231
PSERIOUS	0.115	0.279
WTCONSID	-0.247	0.021
REGDRCNT	-0.047	0.671

Table 25b: Assess change in other variables' parameter estimates, not PSERIOUS or REGDRCNT

Variable	Coefficient in Base regression	Coefficient in Regression w/out HISPANIC	Δ in Coefficient (%)	Δ Greater than 15%?
TOTREG	0.098	0.107	9%	N
TRIAGE	0.182	0.129	-29%	Y
PSERIOUS	0.086	0.115	34%	N/A*
WTCONSID	-0.217	-0.247	14%	N
REGDRCNT	-0.015	-0.047	213%	N/A*

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether HISPANIC is a confounder

HISPANIC may confound TRIAGE and will remain in the regression

Table 26a: Remove PSERIOUS, (leave in HISPANIC and REGDRCNT)

Model Adjusted R-Square		0.078
F-Value	p=0.036	2.516
Variable	Standardized Coefficients Beta (hours)	P‡
TOTREG	0.092	0.381
TRIAGE	0.191	0.092
WTCONSID	-0.216	0.043
REGDRCNT	-0.013	0.908
HISPANIC	0.091	0.399

Appendix Xlc

Table 26b: Assess change in other variables' parameter estimates, not HISPANIC or REGDRCNT

Variable	Coefficient in Base regression	Coefficient in Regression w/out PSERIOUS	Δ in Coefficient (%)	Δ Greater than 15%?
TOTREG	0.098	0.092	-6%	N
TRIAGE	0.182	0.191	5%	N
HISPANIC	0.088	0.091	3%	N/A*
WTCONSID	-0.217	-0.216	0%	N
REGDRCNT	-0.015	-0.013	-13%	N/A*

PSERIOUS does not change any of the base variables by more than 15%, it is probably not a confounder and will not be included in the Actual Wait Time regression

Table 27a: Remove REGDRCNT, (leave in HISPANIC and PSERIOUS)

Model Adjusted R-Square		0.091
F-Value	p=0.016	2.970
Variable	Standardized Coefficients Beta (hours)	P‡
TOTREG	0.137	0.173
TRIAGE	0.218	0.037
WTCONSID	-0.159	0.106
HISPANIC	0.111	0.275
PSERIOUS	0.086	0.389

Table 27b: Assess change in other variables' parameter estimates, not HISPANIC or PSERIOUS

Variable	Coefficient in Base regression	Coefficient in Regression w/out REGDRCNT	Δ in Coefficient (%)	Δ Greater than 15%?
TOTREG	0.098	0.137	40%	Y
TRIAGE	0.182	0.218	20%	Y
HISPANIC	0.088	0.111	26%	N/A*
PSERIOUS	0.086	0.086	0%	N/A*
WTCONSID	-0.217	-0.159	-27%	Y

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether REGDRCNT is a confounder

REGDRCNT may confound TOTREG, TRIAGE, and WTCONSID and will remain in the regression

Appendix Xlc

Table 28: Add Category 3 variables

Model Adjusted R-Square		0.258
F-Value	p=0.004	2.963
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	0.049	0.68
TRIAGE	0.369	0.013
WTCONSID	-0.248	0.042
HISPANIC	0.286	0.032
REGDRCNT	0.225	0.084
CHILDAGE	0.141	0.252
CHRONILL	-0.315	0.013
MEDICAID	-0.315	0.042
REGDR12M	0.08	0.498
ANYED12M	-0.357	0.011
PEYALEED	0.225	0.108

Of the Category 3 variables, CHILDAGE and REGDR12M have $p > 0.25$

Table 29a: Remove CHILDAGE, (leave in REGDR12M for analysis)

Model Adjusted R-Square		0.253
F-Value	p=0.004	3.105
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	0.078	0.503
TRIAGE	0.323	0.023
WTCONSID	-0.242	0.048
HISPANIC	0.273	0.041
REGDRCNT	0.202	0.117
CHRONILL	-0.298	0.018
MEDICAID	-0.306	0.048
REGDR12M	0.057	0.626
ANYED12M	-0.352	0.012
PEYALEED	0.215	0.125

Appendix Xlc

Table 29b: Assess change in other variables' parameter estimates, not REGDR12M

Variable	Coefficient in Base regression	Coefficient in Regression w/out CHILDAGE	Δ in Coefficient (%)	Δ Greater than 15%?
TOTREG	0.049	0.078	59%	Y
TRIAGE	0.369	0.323	-12%	N
WTCONSID	-0.248	-0.242	-2%	N
HISPANIC	0.286	0.273	-5%	N
REGDRCNT	0.225	0.202	-10%	N
CHRONILL	-0.315	-0.298	-5%	N
MEDICAID	-0.315	-0.306	-3%	N
REGDR12M	0.08	0.057	-29%	N/A*
ANYED12M	-0.357	-0.352	-1%	N
PEYALEED	0.225	0.215	-4%	N

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether CHILDAGE is a confounder

CHILDAGE may confound TOTREG and will remain in the regression

Table 30a: Remove REGDR12M, (leave in CHILDAGE for analysis)

Model Adjusted R-Square		0.256
F-Value	p=0.002	3.377
Variable	Standardized Coefficients Beta (hours)	P†
TOTREG	-0.006	0.954
TRIAGE	0.411	0.003
WTCONSID	-0.288	0.01
HISPANIC	0.26	0.042
REGDRCNT	0.176	0.144
CHRONILL	-0.239	0.043
MEDICAID	-0.327	0.021
ANYED12M	-0.318	0.015
PEYALEED	0.178	0.168
CHILDAGE	0.172	0.139

Appendix Xlc

Table 30b: Assess change in other variables' parameter estimates, not REGDR12M

Variable	Coefficient in Base regression	Coefficient in Regression w/out REGDR12M	Δ in Coefficient (%)	Δ Greater than 15%?
TOTREG	0.049	-0.006	-112%	Y
TRIAGE	0.369	0.411	11%	N
WTCONSID	-0.248	-0.288	16%	Y
HISPANIC	0.286	0.26	-9%	N
REGDRCNT	0.225	0.176	-22%	Y
CHILDAGE	0.141	0.172	22%	N/A*
CHRONILL	-0.315	-0.239	-24%	Y
MEDICAID	-0.315	-0.327	4%	N
ANYED12M	-0.357	-0.318	-11%	N
PEYALEED	0.225	0.178	-21%	Y

*Indicates variable that also has a $p > 0.25$ in base regression. Changes in this variable will not be used to assess whether REGDR12M is a confounder

REGDR12M may confound TOTREG, WTCONSID, REGDRCNT, CHRONILL, and PEYALEED and will remain in the regression

Table 31: Add QUESLAN for Final Regression

Model Adjusted R-Square		0.257
F-Value	p=0.006	2.786
Variable	Standardized Coefficients Beta (hours)	P‡
TOTREG*	0.039	0.74
TRIAGE**	0.406	0.008
HISPANIC	-0.221	0.078
WTCONSID	0.183	0.284
REGDRCNT	0.216	0.098
MEDICAID	-0.321	0.012
ANYED12M**	-0.34	0.031
PEYALEED**	-0.38	0.008
CHILDAGE	0.224	0.111
CHRONILL	0.149	0.228
REGDR12M	0.085	0.469
QUESLAN	0.157	0.347

* $p \leq 0.01$

** $p \leq 0.05$

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